

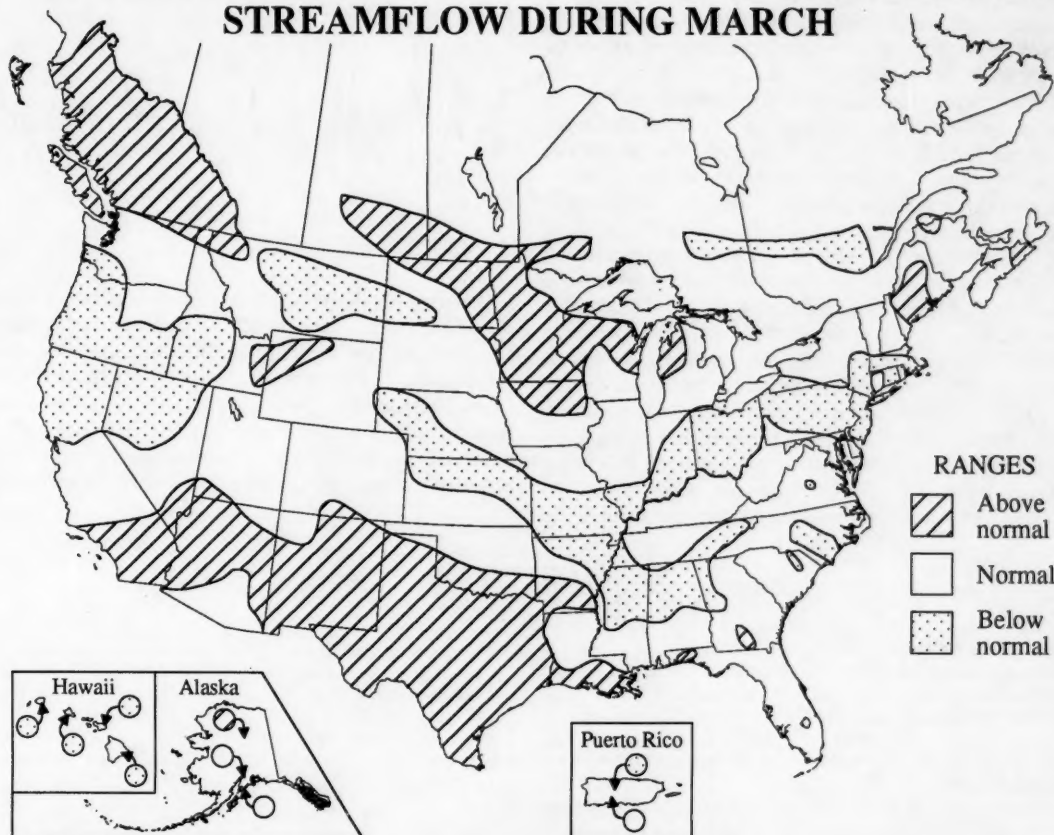
National Water Conditions

UNITED STATES
Department of the Interior
Geological Survey

CANADA
Department of the Environment
Water Resources Branch

MARCH 1992

STREAMFLOW DURING MARCH



Drought is still affecting several large areas. In the East, for example, the contents of the New York City Reservoir System were 26 percent below the long-term average for the end of March. In California, total streamflow, reservoir contents, and ground-water levels remained well-below average. Streamflow and reservoir contents were also well-below average in parts of the Pacific Northwest.

March streamflow was in the normal to above-normal range at 71 percent of the index stations in the United States, southern Canada, and Puerto Rico during the month, compared with 71 percent of stations in those ranges during February. Below-normal range streamflow occurred in 20 percent of the area of the conterminous United States and southern Canada during March, compared with 18 percent during February. Total flow of during March for the index stations in the conterminous United States and southern Canada was 8 percent below median, after a 30 percent increase from last month.

The combined flow of the 3 largest rivers in the lower 48 States—Mississippi, St. Lawrence, and Columbia—averaged 4 percent below median but in the normal range, after a 47 percent increase in flow from February to March. Flow of all three rivers was in the normal range.

Month-end index reservoir contents were in the below-average range at 29 of 100 reporting sites, compared with 29 of 100 at the end of February, and 36 of 100 at the end of March 1991. Contents were in the above-average range at 39 reservoirs, compared with 42 last month, and 42 a year ago. Two reservoirs had less than 10 percent of normal maximum contents: Lake Tahoe, California-Nevada; and Rye Patch, Nevada.

Mean March elevations at four master gages on the Great Lakes (provisional National Ocean Service data) were in the normal range and above median on Lake Superior and Lake Erie, and in the normal range and below median on Lake Huron and Lake Ontario.

Utah's Great Salt Lake rose 0.10 foot, ending the month at 4,202.30 feet above National Geodetic Vertical Datum. Lake level was 0.50 foot lower than at the end of March 1991.

Streamflow decreased from that for February in the Florida and Gulf of Mexico, Southern Great Plains and Rio Grande, and also the Pacific Slope basins, and was above median in the Hudson Bay, St. Lawrence River, Upper Mississippi River, Missouri River, Southern Great Plains and Rio Grande, and also the Colorado River basin.

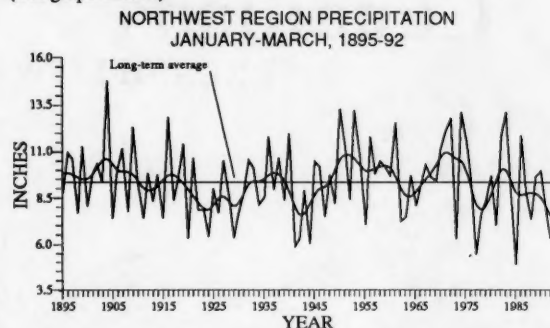
Ground-water levels were generally at or below long-term averages in the most Regions near the end of March, and generally below last month's levels except in the Western Mountain Ranges region, High Plains region, Glaciated Central region, and also the Piedmont and Blue Ridge region, where levels were generally above last month's, and in the Southeast Coastal Plain region, where water levels were mixed with respect to last month's levels.

New extremes occurred at 32 ground-water index stations during March—27 lows (including 4 all-time) and 5 highs (including 1 all-time)—compared with 32 new extremes last month.

SURFACE-WATER CONDITIONS DURING MARCH 1992

Drought is still affecting several large areas. In the East, for example, the contents of the New York City Reservoir System were 26 percent below the long-term average for the end of March, despite increasing from 59 percent of capacity at the end of February to 70 percent of capacity at the end of March, and about 29 percent less than contents at the end of March 1991. In California, total streamflow, reservoir contents, and ground-water levels remained well-below average. Total flow for March at the six index stations in California was 39 percent below median after a 28 percent decrease from that for February. The persistence and severity of the drought in California is shown by the following: (1) since the end of August 1990 (the most recent month of above-median streamflow), the cumulative streamflow deficit at the six index stations has gone from about 76 percent (revised) of a median year of runoff to about 145 percent of a median year of runoff—about 69 percent of a median year of runoff was “lost” in the last 19 months; (2) the seasonal lows in combined storage for 6 large index reservoirs have generally declined steadily since 1986, bottoming out at 69, 53, 43, 45, 33, and 31 percent of capacity. The current month’s storage in these 6 large reservoirs rose by about 7 percent of total capacity from that for February and is now at 47 percent of normal maximum. More data on California hydrologic conditions are given on pages 7-9. Precipitation, streamflow, reservoir contents, and ground-water levels were all well-below average in much of the Pacific Northwest. (See also page 7.) According to the *Climate Variations Bulletin*, the states of the

Northwest Region, collectively, had their second warmest January through March period on record and their seventh driest such period. (See graph below.)

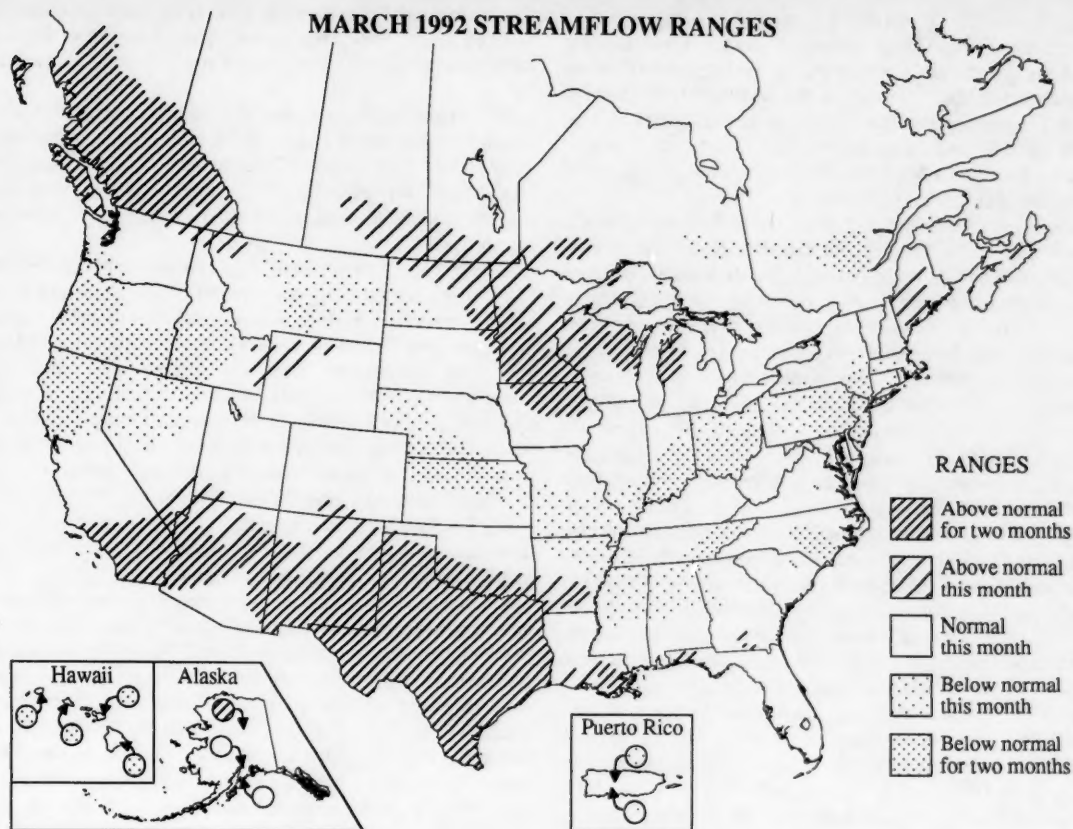


March streamflow decreased from that for February at 44 index stations, remained unchanged at 3 index stations, and increased at 145 index stations, resulting in normal to above-normal range streamflow at 71 percent of the 191 reporting index stations in the United States, southern Canada, and Puerto Rico during the month, compared with 71 percent of stations in those ranges during February, and 85 percent of stations in those ranges during March 1991. Below-normal range streamflow occurred in 20 percent of the area

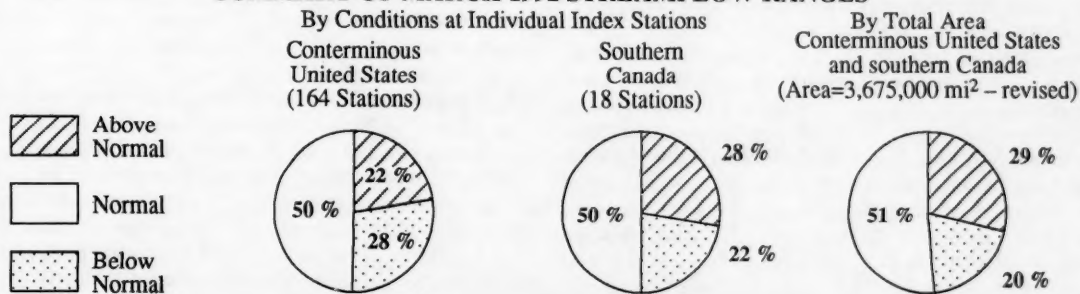
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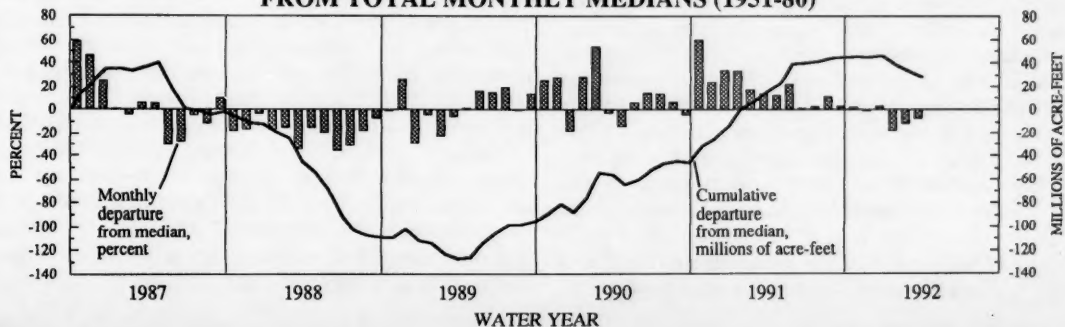
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SUMMARY OF MARCH 1992 STREAMFLOW RANGES



MONTHLY AND CUMULATIVE DEPARTURE OF TOTAL MONTHLY MEANS FROM TOTAL MONTHLY MEDIANS (1951-80)



(Continued from page 2)

of the conterminous United States and southern Canada during March, compared with 18 percent during February, and 17 percent (revised) during March 1991. Total flow of 845,700 cubic feet per second (ft³/s) during March for the 174 reporting index stations in the conterminous United States and southern Canada was 8 percent below median, after a 30 percent increase from last month, and 19 percent less than flow during March 1991.

Six new minimums (two in Kansas, one in Washington, two in Oregon, and one in Hawaii) and five new maximums (one in Saskatchewan, three in Texas, and one in British Columbia) occurred during March (see table on page 4), compared with two new minimums and three new maximums during February. Hydrographs for the stations at which new extremes occurred are on pages 4-7.

The combined flow of the 3 largest rivers in the lower 48 States—Mississippi, St. Lawrence, and Columbia—averaged 1,140,000 ft³/s, 4 percent below median but in the normal range, after a 47 percent increase in flow from February to March. Flow of the St. Lawrence River was in the normal range for the 10th consecutive month. Flow of the Mississippi River was in the normal range after a below-normal range February. Flow of the Columbia River was in the normal range for the second consecutive month after five consecutive months in the below-normal range. Hydrographs for both the combined and individual flows of the "Big 3" are on page 10. Dissolved solids and water temperatures at four large river stations are also given on page 10. Flow data for the "Big 3" and 42 other large rivers are given in the Flow of Large Rivers table on page 11.

Month-end index reservoir contents were in the below-average range (below the month-end average for the period of record by more than 5 percent of normal maximum contents) at 29 of 100 reporting sites, compared with 29 of 100 at the end of February, and 36 of 100 at the end of March 1991, including most reservoirs in Nova Scotia, Maryland, Nebraska, the Dakotas, Idaho, Utah, Nevada, California, and the Colorado River Storage Project. Contents were in the above-average range at 39 reservoirs (compared with 42 last month, and 42 a year ago), including most reservoirs in Maine, New Hampshire, Vermont, Massachusetts, New York, Wisconsin, Minnesota, Texas, Arizona, and New Mexico. Reservoirs with contents in the below-average range and significantly lower than last year (with normal maximum contents of at least 1,000,000 acre-feet) are: the New York City Reservoir System, New York; Boise River, Idaho; and Clair Engle Lake, California. Two reservoirs had less than 10 percent of normal maximum contents (March average in parentheses): Lake Tahoe, California-Nevada, 0 percent (54); and Rye Patch, Nevada, 8 percent (61). Graphs of contents for seven reservoirs are shown on page 12 with contents for the 100 reporting reservoirs given on page 13. Maps on pages 15 and 18-19 show reservoir storage conditions near the end of March 1992 and March 1991 on streamflow maps.

Mean March elevations at four master gages on the Great Lakes (provisional National Ocean Service data) were in the normal range and above median on Lake Superior and Lake Erie, and in the normal range and below median on Lake Huron and Lake Ontario. Levels fell from those for February on Lake Superior, and rose from those for February on the other three lakes. March levels ranged from 0.16 foot lower (Lake Superior) to 0.36 foot higher (Lake Erie and Lake Ontario) than those for February. Monthly means have now been in the normal range for 6 months on Lake Superior, 22 months on Lake Huron, 12 months on Lake Erie, and 1 month on Lake Ontario. Monthly means had been in the below-normal range on Lake Ontario for 6 months prior to this month. March 1992 levels ranged from 1.82

foot lower (Lake Ontario) to 0.37 foot higher (Lake Superior) than those for March 1991. Stage hydrographs for the master gages on Lake Superior, Lake Huron, Lake Erie, and Lake Ontario are on page 14.

Utah's Great Salt Lake (graph on page 14) remained unchanged March 1-15, and rose 0.10 foot March 16-31, ending the month at 4,202.30 feet above National Geodetic Vertical Datum. Lake level was 0.50 foot lower than at the end of March 1991, and 9.55 feet lower than the maximum of record which, occurred in June 1986 and March-April 1987.

Maps on page 15 show streamflow conditions for March 1992 and March 1991. March 1992 has about 80 percent more area in the above-normal range, about 18 percent more area in the below-normal range, and about 24 percent less area in the normal range than March 1991. Below-normal range streamflow occurred during both months in parts of Oregon, California, Nevada, Utah, Idaho, Montana, Colorado, Kansas, Nebraska, North Dakota, Missouri, and Ohio. Above-normal range streamflow occurred during both months in parts of Alaska, British Columbia, Saskatchewan, Idaho, Montana, Minnesota, Iowa, Michigan, Maine, Nova Scotia, California, Arizona, New Mexico, Texas, Florida, and Georgia. Both maps also show reservoir storage near the end of the month at all reporting index reservoir stations for comparison with streamflow.

Graphs for 12 hydrologic areas show monthly percent departure of streamflow from median for the 1987-92 water years (page 16) and also compare monthly streamflow for the 1991 and 1992 water years with median monthly streamflow for 1951-80 (page 17). Streamflow decreased from that for February in the Florida and Gulf of Mexico, Southern Great Plains and Rio Grande, and also the Pacific Slope basins, and increased in the other 9 basins. Streamflow was above median in the Hudson Bay, St. Lawrence River, Upper Mississippi River, Missouri River, Southern Great Plains and Rio Grande, and also the Colorado River basin, and below median in the other 6 basins.

Maps on page 18 show streamflow conditions for winter 1992 (January 1-March 31, 1992) and winter 1991 (January 1-March 31, 1991). Winter 1992 has about 17 percent more area in the above-normal range, about the same area in the below-normal range, and about 9 percent less area in the normal range than winter 1991. Below-normal range streamflow occurred during both winters in parts of Oregon, California, Nevada, Utah, Idaho, Montana, Wyoming, Colorado, Kansas, Nebraska, Quebec, Nova Scotia, North Carolina, and Florida. Above-normal range streamflow occurred during both winters in parts of Alaska, Minnesota, Iowa, Wisconsin, Michigan, Arizona, New Mexico, Colorado, Texas, Oklahoma, Arkansas, Louisiana, Mississippi, Georgia, and Puerto Rico. Both maps also show reservoir storage near the end of March at all reporting index reservoir stations for comparison with streamflow.

Maps on page 19 show streamflow conditions for fall-winter 1992 (October 1, 1991-March 31, 1992) and fall-winter 1991 (October 1, 1990-March 31, 1991). Fall-winter 1992 has about 8 percent less area in the above-normal range, about 20 percent less area in the below-normal range, and about 14 percent more area in the normal range than fall-winter 1991. Below-normal range streamflow occurred during both periods in parts of Oregon, California, Nevada, Utah, Idaho, Montana, Wyoming, Colorado, Kansas, Nebraska, the Dakotas, Quebec, Georgia, Alabama, and Florida. Above-normal range streamflow occurred during both periods in parts of Alaska, Michigan, Arizona, New Mexico, Colorado, Texas, Louisiana, and Mississippi. Both maps also show reservoir storage near the end of March at all reporting index reservoir stations for comparison with streamflow.

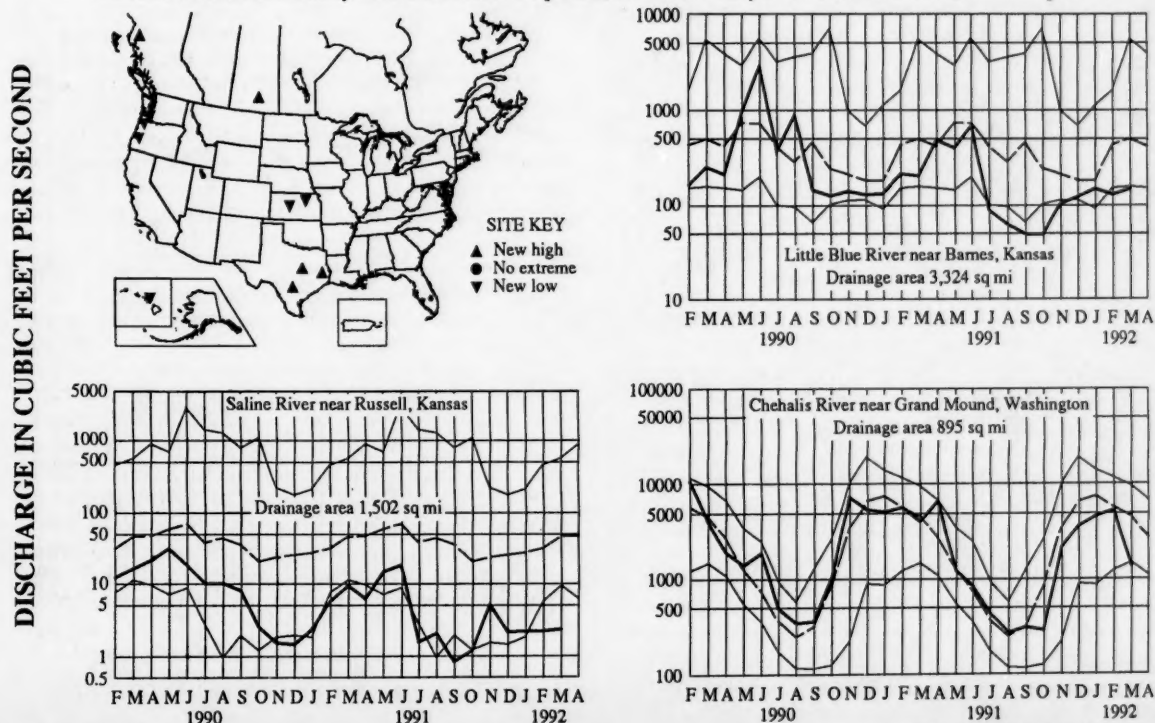
NEW EXTREMES DURING MARCH 1992 AT STREAMFLOW INDEX STATION

Station number	Stream and place of determination	Drainage area (square miles)	Years of record	Previous March extremes (period of record)		March 1992			
				Monthly mean in cfs (year)	Daily mean in cfs (year)	Monthly mean in cfs	Percent of median	Daily mean in cfs	Day
LOW FLOWS									
06867000	Saline River near Russell, Kansas	1,502	40	9.25 (1991)	4.08 (1991)	2.27	5	.92	14
06884400	Little Blue River near Barnes, Kansas	3,324	33	155 (1981)	128 (1981)	146	30	122	3
12027500	Chehalis River near Grand Mound, Washington	895	63	1,462 (1941)	802 (1941)	1,364	30	728	31
14301500	Wilson River near Tillamook, Oregon	161	61	595 (1941)	290 (1965)	392	23	210	31
14321000	Umpqua River near Elkton, Oregon	3,683	86	3,462 (1941)	2,160 (1941)	2,876	25	1,990	29
16587000	Honopou Stream near Huelo, Maui, Hawaii	.64	80	.86 (1983)	.42 (1986)	.79	16	.51	*
HIGH FLOWS									
05940100	Qu'Appelle River at Lumsden, Saskatchewan, Canada	7,066	35	324 (1968)	1,180 (1928)	350	544	632	25
08033500	Neches River near Rockland, Texas	3,636	88	9,575 (1924)	30,400 (1922)	13,750	543	27,000	7
08095000	North Bosque River near Clifton, Texas	968	68	1,198 (1970)	12,900 (1977)	1,231	4,022	8,470	4
08167500	Guadalupe River near Spring Branch, Texas	1,315	69	1,448 (1979)	6,380 (1979)	3,361	1,942	16,200	4
08960100	Skeena River at USK, British Columbia, Canada	16,293	58	9,251 (1963)	13,594 (1963)	19,562	387	25,458	18

*Occurred more than once.

MONTHLY MEAN DISCHARGE OF SELECTED STREAMS

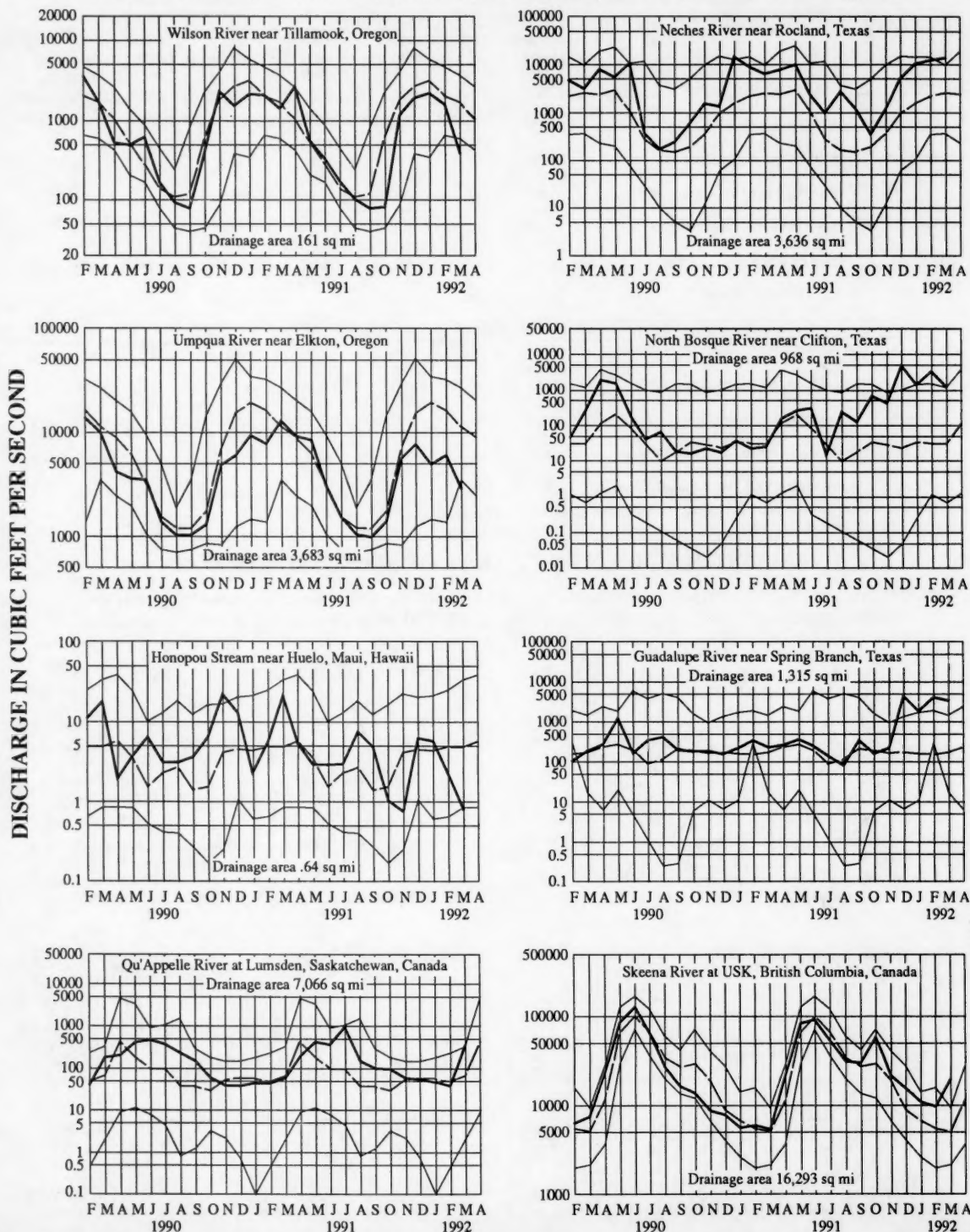
Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period.



March 1992

MONTHLY MEAN DISCHARGE OF SELECTED STREAMS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period.



MARCH WEATHER SUMMARY

(From *Weekly Weather and Crop Bulletin*,
USDA/NOAA Joint Agricultural Weather Facility)

The March boundary between spring warmth and residual winter chill—the polar jet stream—tilted sharply after the 8th, punching cold air into the Plains and the East. Although temperatures quickly rebounded in the Plains after cold snaps on the 10th and the 23rd, cool weather persisted in the East into the first week of April. Monthly temperatures were below normal throughout the East Coast States despite an early-month “heatwave” that produced temperatures in the 80’s as far north as the Virginias. The northern Plains were home to the Nation’s most anomalous warmth for the fourth month in a row, with temperatures up to 12 °F above normal.

The subtropical jet stream tended to buckle near Baja California during March. As a result, a moist, southerly air flow prevailed across the Southwest, and occasionally reached into the central Rockies, central Plains, and western Great Lakes. Precipitation was unusually heavy (more than four times normal) in western Arizona, southern Nevada, and southern California. Las Vegas, NV, set a precipitation record for any month with 4.80 inches of rain, topping the mark of 3.39 inches recorded in September 1939 (normal annual rainfall is 4.19 inches). In Texas, although rainfall was not as widespread and excessive as it was during the winter, south-central sections continued to be drenched. San Antonio, TX, set a March record with 6.12 inches of rain, besting the old highwater mark of 5.91 inches notched in 1921. Organized areas of abnormal dryness were confined to the Northwest, parts of the Southeast and a narrow strip from north-central Texas to the Corn Belt.

Water Conditions in the Northwest: Dryness plagued the Northwest again in March. By late March, Oregon’s 27 major irrigation reservoirs contained only 53 percent of their normal water volume for this time of year. As a result, 22 of 36 Oregon counties (including all counties east of the Cascades) have declared drought emergencies. Due to dryness and warmth end-of-March snowpack in the Washington Cascades ranged from 50 to 70 percent of normal. In central and southern Idaho reservoir storage was less than 50 percent of normal. The March dryness extended as far south as the Sierra Nevada of California, virtually assuring a sixth drier-than-normal rainy season for the State’s major watershed area. Western Sierra Nevada precipitation was 78 percent of normal in March, and has been 72 percent of normal since October 1, 1991, according to the State’s Drought Center. One bright note is that the State’s early-April reservoir holdings were 70 percent of normal, up from 55 percent on February 1, boosted by heavy precipitation in February and subsequent runoff. This represented an improvement of 750 billion gallons of water from April 1, 1991, when water holdings were 60 percent of normal.

In contrast to the Northwest, spring-time storms raked the Gulf Coast States during the month. Central Florida bore the brunt of major hailstorms on the 6th and the 19th. The latter hail event pounded 20 nurseries in Lake and Orange Counties. The Houston, TX, area had its worst flash flooding since 1983 on the 4th as slow-moving storms dumped up to 10 inches of rain. In addition more than 50 tornadoes tore up scattered portions of the Plains and the Southeast during the month.

CALIFORNIA HYDROLOGIC CONDITIONS

California Water Conditions

(From *California Water Supply Outlook*,
California Department of Water Resources)

It’s still too early to say the rainy season is over, because April has occasionally brought very heavy precipitation to California. For example in April 1880 it rained 14.2 inches in Sacramento, with 8.4 inches falling in 2 days on the 20th and 21st of the month. However, as an average, April only supplies 7 percent of the annual precipitation in the Northern Sierra and 10 percent in the Southern Sierra. April storms seldom produce enough runoff to make a major difference in our water supply.

On April 1, The California Cooperative Snow Surveys forecast Sacramento River Index seasonal runoff for 1991-92. The median forecast is

9.5 million acre-feet (MAF), 52 percent of average. The range in runoff projections has narrowed from about 45 percent of average if the rest of the season is very dry to about 70 percent of average if the rest of the season is unseasonably wet. In either case the water year in the Sacramento Basin would be classified as critical.

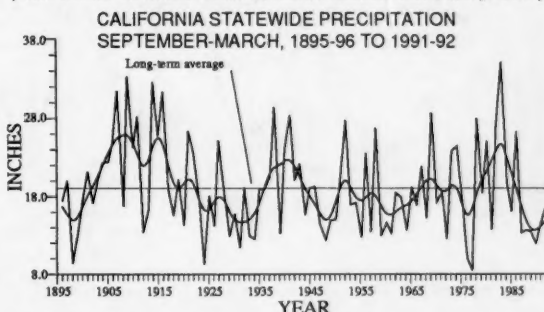
This year significant snowmelt occurred during the last week of March, leaving the April 1 water content at 60 percent statewide compared to 75 percent a year ago. Last year the melt was slow with water content in the pack holding fairly high thru April. In 1990 the pack began melting heavily in mid-March due to unseasonably warm temperatures which generally continued thru May and by the end of April little snow remained except at very high elevations.

Reservoir storage improved during March 1992 increasing from 60 to 70 percent of average statewide, with wide regional variations. This is 10 percent more than last year at this time. The State’s 155 major reservoirs on March 31 were storing 18.4 MAF compared to 15.9 MAF last year at the same time. The historical average storage for March 31 is 26.5 MAF.

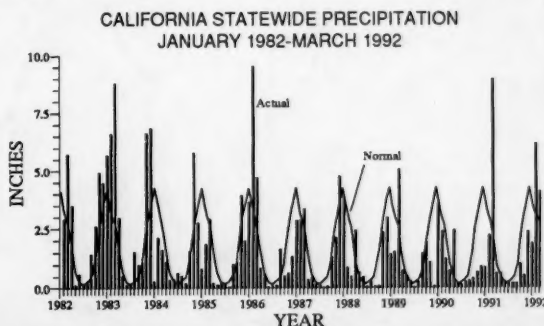
Many areas of the State have received normal or above normal precipitation this year. However, the areas which supply the major share of winter and spring runoff for distribution to the farms and cities during the summer have been mostly dry. For this reason most Californians will feel a water supply pinch again this year.

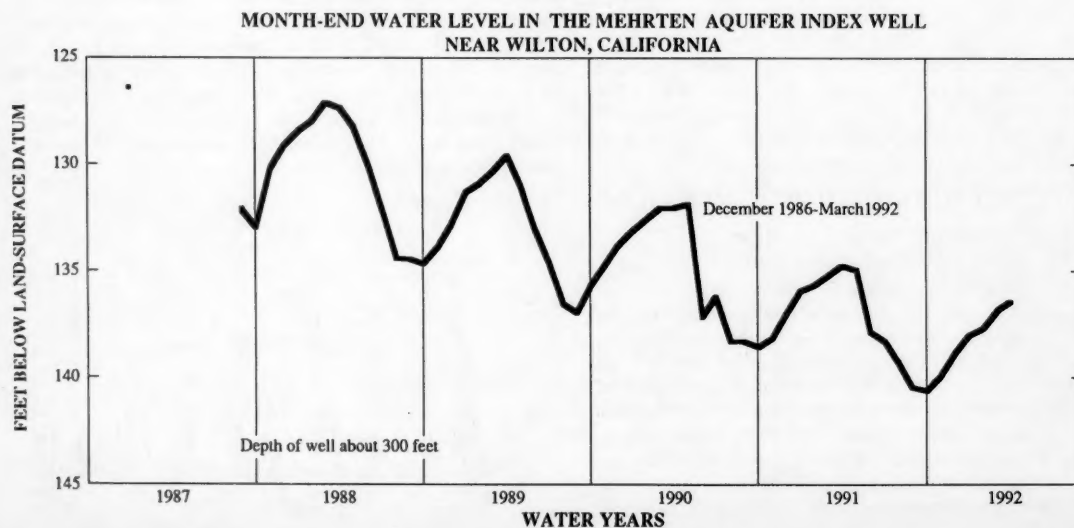
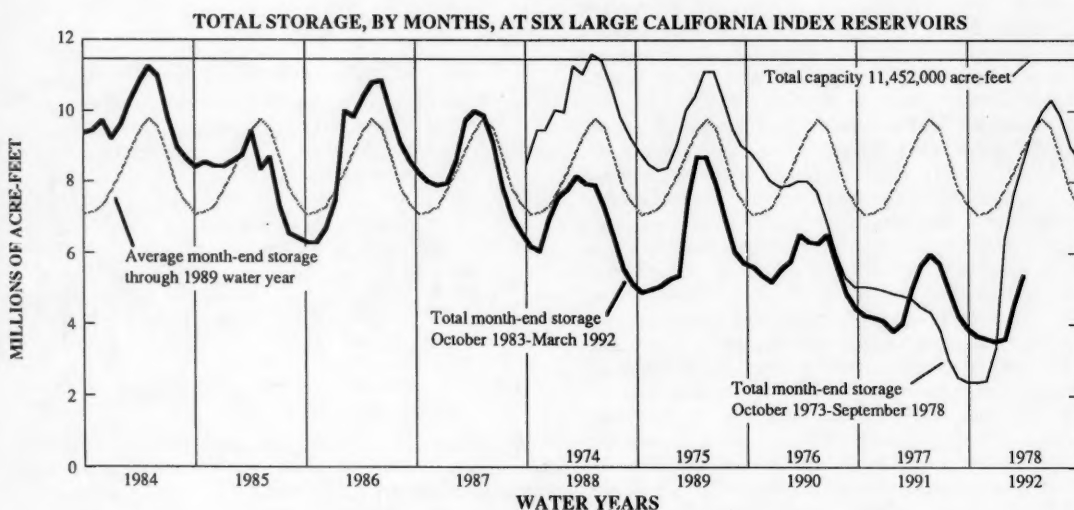
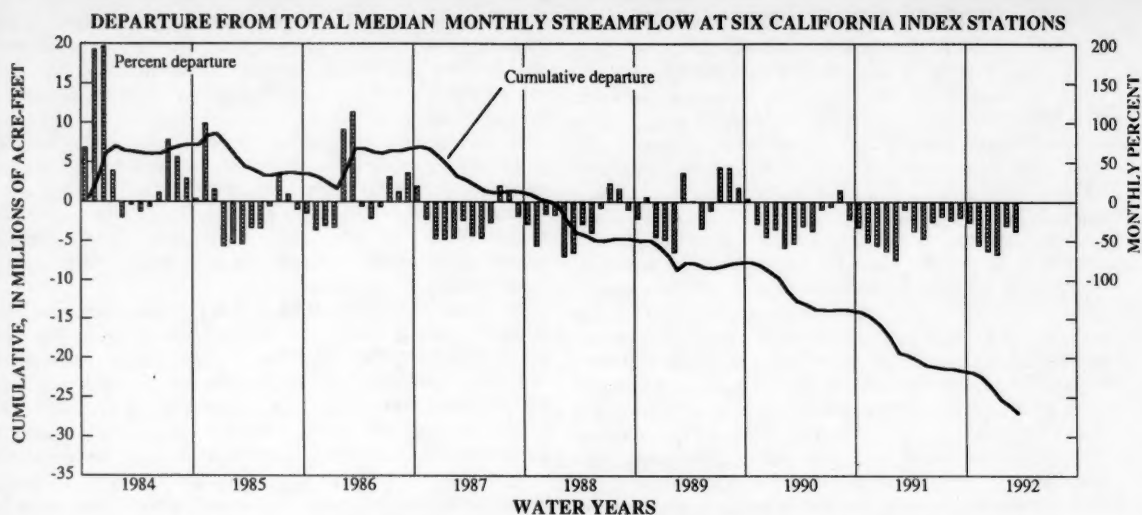
California Precipitation

(From *Climate Variations Bulletin*, National Climatic Data Center, NOAA)

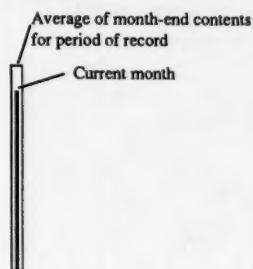


Despite the recent precipitation, the long-term California drought continues. California statewide precipitation for the seven month period September through March, 1895-1992 is shown in the graph above. The actual yearly value is up from that of the same period last year but the filter curve value is still considerably below the long-term mean. Looking at the deficit in precipitation from another perspective, the graph below shows the monthly California statewide precipitation for the period January 1982 through March 1992. The actual March 1992 value was considerably above the normal for the second month in a row but upon closer inspection, we see that this phenomena has occurred only these two times in the past year.

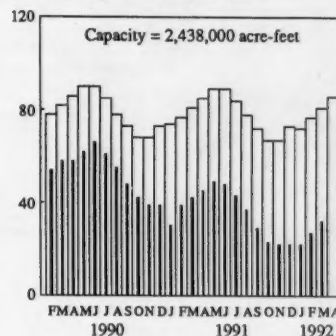




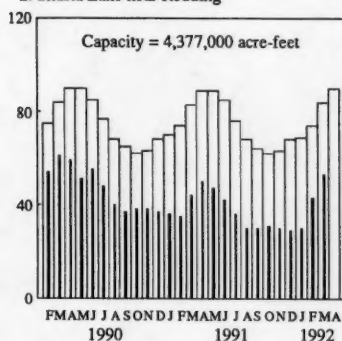
CALIFORNIA RESERVOIR INDEX STATIONS



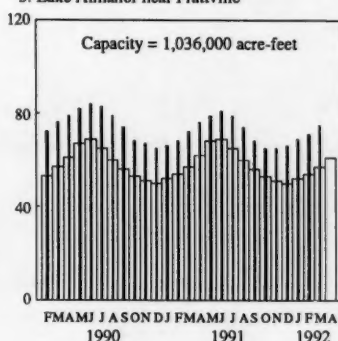
1. Clair Engle Lake near Lewiston



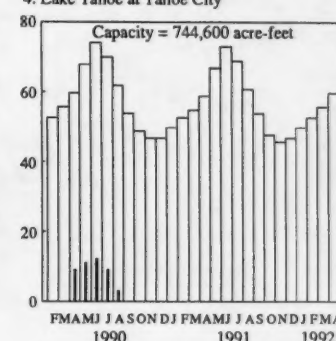
2. Shasta Lake near Redding



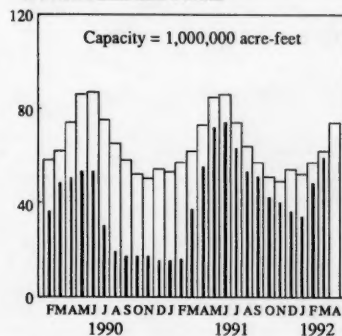
3. Lake Almanor near Prattville



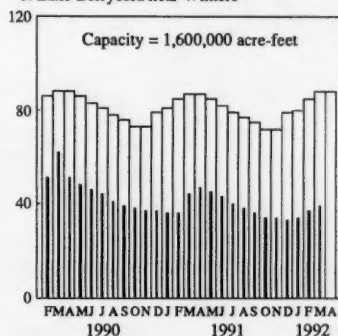
4. Lake Tahoe at Tahoe City



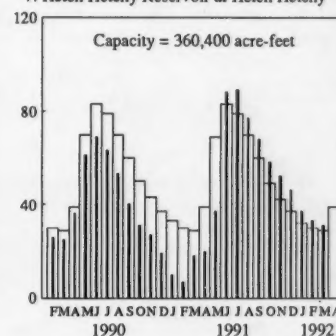
5. Folsom Lake near Folsom



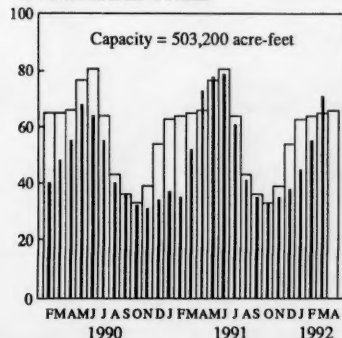
6. Lake Berryessa near Winters



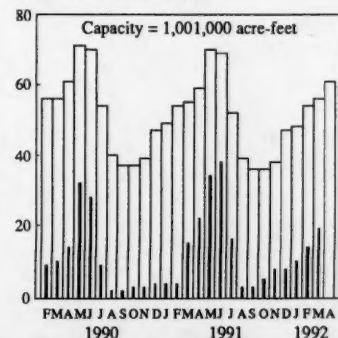
7. Hetch Hetchy Reservoir at Hetch Hetchy



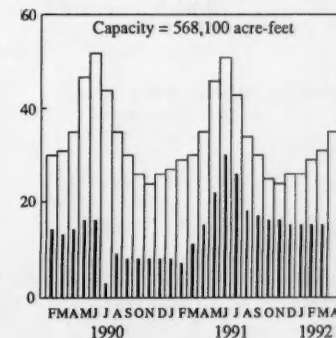
8. Millerton Lake at Friant



9. Pine Flat Lake near Piedra



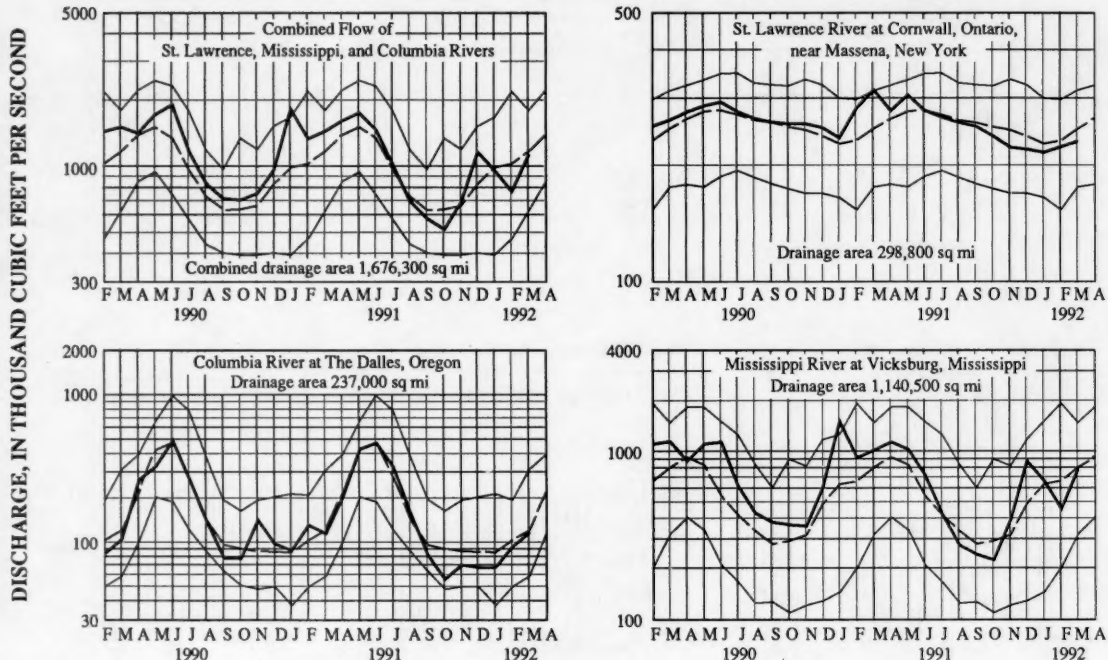
10. Isabella Lake near Lake Isabella



PERCENT OF NORMAL CAPACITY

HYDROGRAPHS FOR THE "BIG THREE" RIVERS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period.



Provisional data; subject to revision

DISSOLVED SOLIDS AND WATER TEMPERATURES, FOR MARCH 1992, AT DOWNSTREAM SITES ON FIVE LARGE RIVERS

Station number	Station name	March data of following calendar years	Stream discharge during month Mean (cfs)	Dissolved-solids concentration ¹		Dissolved-solids discharge ¹			Water temperature ²		
				Mini-mum (mg/L)	Maxi-mum (mg/L)	Mean	Mini-mum (tons per day)	Maxi-mum	Mean in °C	Mini-mum in °C	Maxi-mum in °C
01463500	Delaware River at Trenton, New Jersey, (Morrisville, Pennsylvania)	1992 1945-91 (Extreme yr)	13,240 19,710 420,040	78 44 (1945)	108 145 (1990)	3,310 3,730	2,080 1,100	7,850 98,100	5.0 35.5	3.0 0	8.5 9.5
07289000	Mississippi River at Vicksburg, Mississippi	1992 1976-91 (Extreme yr)	789,450 936,800 4814,500	194 143 (1989)	249 320 (1988)	455,590 899,100	372,450 108,000	543,630 803,000	10.0 9.0	5.0 5.0	7.5 14.5
03612500	Ohio River at lock and dam 53, near Grand Chain, Illinois, (streamflow station at Metropolis, Illinois)	1992 1955-91 (Extreme yr)	415,700 528,300 4578,300	168 128 (1955)	260 312 (1968)	...	149,000 50,000	266,000 776,000	...	10.0 0.5	11.0 14.5
06934500	Missouri River at Hermann, Missouri, (60 miles west of St. Louis, Missouri)	1992 1976-91 (Extreme yr)	62,360 104,000 474,200	258 186 (1978)	409 530 (1981)	55,970 88,170	39,970 29,300	103,100 199,000	11.5 8.5	9.0 0	16.0 17.5
14128910	Columbia River at Warrendale, Oregon (streamflow station at The Dalles, Oregon)	1992 1976-91 (Extreme yr)	164,000 195,300 4123,000	102 87 (1980)	114 136 (1986)	47,800 88,000	31,300 25,600	61,800 114,300	7.5 6.0	6.5 3.0	9.0 8.0

¹Dissolved-solids concentrations, when not analyzed directly, are calculated on basis of measurements of specific conductance.

²To convert °C to °F: [(1.8 x °C) + 32] = °F.

³Mean for 8-year period (1983-91).

⁴Median of monthly values for 30-year reference period, water years 1951-80, for comparison with data for current month.

FLOW OF LARGE RIVERS DURING MARCH 1992

Station number	Stream and place of determination	Drainage area (square miles)	Average discharge through September	Monthly mean discharge (cubic feet per second)	Percent of median monthly discharge 1951-80	March 1992				Date
			1985 (cubic feet per second)			Change in discharge from previous month (percent)	Discharge near end of month			
							Cubic feet per second	Million gallons per day		
01014000	St. John River below Fish River at Fort Kent, Maine ...	5,665	9,758	3,906	161	33	6,400	4,140	31	
01318500	Hudson River at Hadley, New York.....	1,664	2,908	3,930	131	271	5,000	3,200	31	
01357500	Mohawk River at Cohoes, New York.....	3,456	5,683	† 6,670	64	103	7,000	4,500	31	
01463500	Delaware River at Trenton, New Jersey.....	6,780	11,670	† 13,240	66	110	18,400	11,900	31	
01570500	Susquehanna River at Harrisburg, Pennsylvania.....	24,100	34,340	† 54,600	76	210	137,000	88,500	30	
01646500	Potomac River near Washington, District of Columbia...	11,560	111,500	† 19,600	80	182	...	...	...
02105500	Cape Fear River at William O. Huske Lock, near Tarheel, North Carolina.	4,852	5,002	† 5,575	55	94	...	...	...
02131000	Pee Dee River at Pee Dee, South Carolina.....	8,830	9,871	14,080	78	117	14,700	9,500	31	
02226000	Altamaha River at Doctortown, Georgia.....	13,600	13,730	30,220	96	18	23,000	14,900	31	
02320500	Suwannee River at Branford, Florida.....	7,880	6,986	13,190	117	20	11,500	7,430	31	
02358000	Apalachicola River at Chattahoochee, Florida.....	17,200	22,420	36,240	88	-11	27,000	17,500	31	
02467000	Tombigbee River at Demopolis lock and dam, near Coatopa, Alabama.	15,385	23,520	† 28,860	61	-14	15,800	10,200	31	
02489500	Pearl River near Bogalusa, Louisiana.....	6,573	9,880	14,380	82	-33	7,400	4,780	31	
03049500	Allegheny River at Natrona, Pennsylvania.....	11,410	19,580	† 126,680	66	39	44,300	28,600	29	
03085000	Monongahela River at Braddock, Pennsylvania.....	7,337	12,480	† 23,540	111	51	21,400	13,800	29	
03193000	Kanawha River at Kanawha Falls, West Virginia.....	8,367	12,550	22,770	95	50	15,900	10,300	30	
03234500	Scioto River at Higby, Ohio.....	5,131	4,583	† 4,916	51	167	5,410	3,500	31	
03294500	Ohio River at Louisville, Kentucky ² #.....	91,170	115,800	225,200	91	96	172,000	111,000	30	
03377500	Wabash River at Mount Carmel, Illinois.....	28,635	27,660	† 19,090	33	15	27,700	17,900	31	
03469000	French Broad River below Douglas Dam, Tennessee ³ #.	4,543	16,739	† 19,858	84	40	...	...	...
04084500	Fox River at Rapide Croche Dam, near Wrightstown, Wisconsin. ²	6,010	4,238	* 5,874	139	72	5,240	3,390	31	
04264331	St. Lawrence River at Cornwall, Ontario, near Massena, New York. ⁴ #	298,800	243,900	232,000	93	3	235,000	152,000	31	
02NG001	St. Maurice River at Grand Mere, Quebec.....	16,300	24,910	† 9,550	114	61	19,000	12,300	31	
05082500	Red River of the North at Grand Forks, North Dakota...	30,100	2,593	* 4,250	228	785	3,770	2,440	31	
05133500	Rainy River at Manitou Rapids, Minnesota.....	19,400	12,920	9,400	97	11	8,400	5,430	24	
05330000	Minnesota River near Jordan, Minnesota.....	16,200	3,680	* 19,890	626	620	13,200	8,530	31	
05331000	Mississippi River at St. Paul, Minnesota ⁴	36,800	11,020	* 34,840	451	337	26,700	17,300	31	
05365500	Chippewa River at Chippewa Falls, Wisconsin.....	5,650	5,149	* 9,160	196	150	7,700	4,980	31	
05407000	Wisconsin River at Muscoda, Wisconsin.....	10,400	8,710	11,350	118	26	12,300	7,950	31	
05446500	Rock River near Joslin, Illinois.....	9,549	6,080	8,950	97	16	9,030	5,840	31	
05474500	Mississippi River at Keokuk, Iowa ⁵	119,000	63,790	* 125,300	149	76	121,000	78,200	31	
06214500	Yellowstone River at Billings, Montana.....	11,795	7,056	† 2,230	72	6	2,120	1,370	31	
06934500	Missouri River at Hermann, Missouri ⁶	524,200	80,880	62,360	84	23	82,300	53,200	31	
07289000	Mississippi River at Vicksburg, Mississippi ⁵ #.....	1,140,500	584,000	789,450	97	73	...	...	...
07331000	Washita River near Dickson, Oklahoma.....	7,202	1,402	* 2,918	492	43	1,590	1,030	27	
08276500	Rio Grande below Taos Junction Bridge, near Taos, New Mexico.	9,730	742	* 936	164	72	1,440	930	31	
09315000	Green River at Green River, Utah.....	44,850	6,391	3,503	87	31	...	...	...
11425500	Sacramento River at Verona, California.....	21,251	19,430	† 19,890	63	-22	...	...	...
13269000	Snake River at Weiser, Idaho.....	69,200	18,520	† 10,800	54	-12	9,740	6,300	31	
13317000	Salmon River at White Bird, Idaho.....	13,550	11,390	5,570	110	43	5,710	3,690	31	
13342500	Clearwater River at Spalding, Idaho.....	9,570	15,510	13,700	107	36	11,300	7,300	31	
14105700	Columbia River at The Dalles, Oregon ⁶ #.....	237,000	193,500	† 118,300	96	25	118,000	76,300	31	
14191000	Willamette River at Salem, Oregon.....	7,280	123,690	† 12,980	39	-58	8,060	5,210	31	
15515500	Tanana River at Nenana, Alaska.....	25,600	23,810	* 7,203	117	-8	...	...	...
08MF005	Fraser River at Hope, British Columbia.....	83,800	96,250	* 62,850	195	51	75,900	49,100	31	

#Indicates stations excluded from the combination bar/line graph. See Explanation of Data.

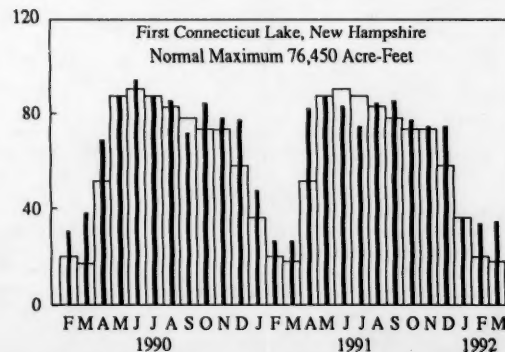
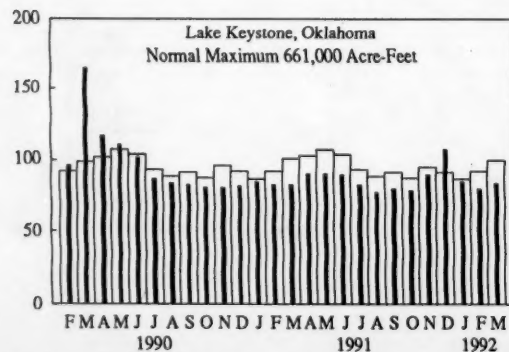
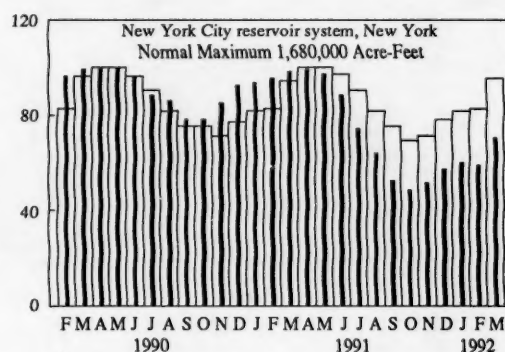
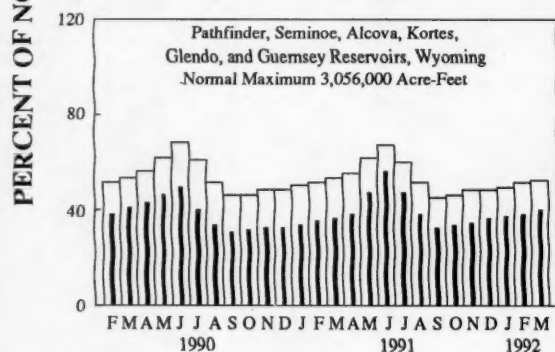
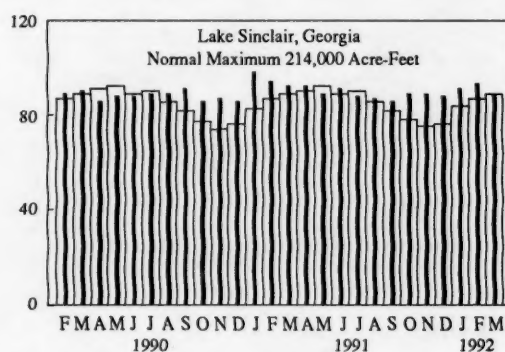
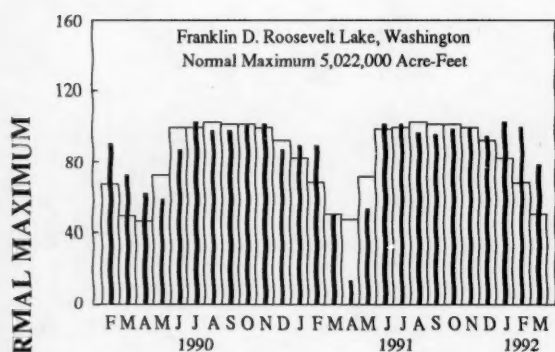
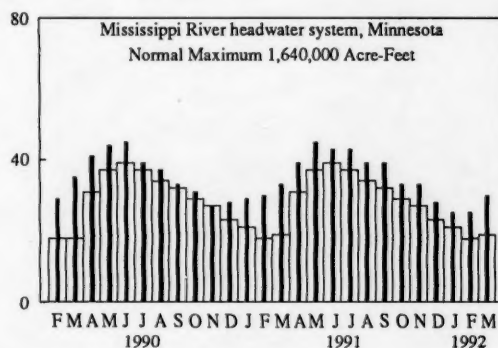
* Above-normal range

† Adjusted.

† Below-normal range

²Records furnished by Corps of Engineers.³Records furnished by Tennessee Valley Authority.⁴Records furnished by Buffalo District, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y., when adjusted for storage in Lake St. Lawrence.⁵Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.⁶Discharge determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.

USABLE CONTENTS OF SELECTED RESERVOIRS AND RESERVOIR SYSTEMS



USABLE CONTENTS OF SELECTED RESERVOIRS AND RESERVOIR SYSTEMS NEAR END OF MARCH 1992

[Contents are expressed in percent of reservoir or reservoir system capacity. The usable capacity of reservoir or reservoir system is shown in the column headed "Normal maximum"]

Reservoir or reservoir system						Reservoir or reservoir system					
Principal uses:						Principal uses:					
F-Flood control						F-Flood control					
I-Irrigation						I-Irrigation					
M-Municipal						M-Municipal					
P-Power						P-Power					
R-Recreation						R-Recreation					
W-Industrial						W-Industrial					
Percent of normal maximum						Percent of normal maximum					
End of	End of	Average	End of	Normal		End of	End of	Average	End of	Normal	
March	March	for	February	maximum		March	March	for	February	maximum	
1992	1991	March	1992	(acre-feet) ¹		1992	1991	March	1992	(acre-feet) ¹	
NOVA SCOTIA											
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Porthook Reservoirs (P).....	† 55	21	64	51	2,226,300	NEBRASKA					
QUEBEC						OKLAHOMA					
Allard (P).....	† 16	28	32	33	280,600	Eufaula (FPR).....	95	97	92	94	2,378,000
Gouin (P).....	43	59	48	48	6,954,000	Keystone (FPR).....	† 83	82	100	79	661,000
MAINE						Tenkiller Ferry (FPR).....	102	104	97	102	628,200
Seven Reservoir Systems (MP).....	* 46	49	36	46	4,107,000	Lake Altus (FIMR).....	* 92	69	54	85	133,000
NEW HAMPSHIRE						Lake O'The Cherokees (FPR).....	90	88	89	89	1,492,000
First Connecticut Lake (P).....	* 34	26	18	33	76,450	OKLAHOMA-TEXAS					
Lake Francis (FPR).....	* 51	49	24	44	99,310	Lake Texoma (FIMPRW).....	95	98	90	97	2,722,000
Lake Winnepesaukee (PR).....	64	68	65	48	165,700	TEXAS					
VERMONT						Bridgeport (IMW).....	* 96	87	51	99	386,400
Harriman (P).....	* 50	49	35	44	116,200	Canyon (FMR).....	* 146	93	82	147	385,600
Somerset (P).....	* 61	65	52	61	57,390	International Amistad (FIMPW).....	* 105	94	83	112	3,497,000
MASSACHUSETTS						International Falcon (FIMPW).....	* 106	64	72	105	2,668,000
Cobble Mountain and Borden Brook (MP).....	* 89	89	78	79	77,920	Livingston (IMW).....	* 99	100	92	109	1,788,000
NEW YORK						Possum Kingdom (IMPRW).....	93	88	93	95	570,200
Great Sacandaga Lake (FPR).....	* 59	64	49	40	786,700	Red Bluff (P).....	* 41	24	31	41	307,000
Indian Lake (FMP).....	* 65	63	49	54	103,300	Toledo Bend (P).....	* 101	93	88	103	4,472,000
New York City Reservoir System (MW).....	† 70	98	95	59	1,680,000	Twin Buttes (FIM).....	* 65	54	36	57	177,800
NEW JERSEY						Lake Kemp (IMW).....	* 100	92	85	103	268,000
Wanaque (M).....	94	100	89	85	85,100	Lake Meredith (FMW).....	38	31	36	39	796,900
PENNSYLVANIA						Lake Travis (FIMPRW).....	* 103	97	82	111	1,144,000
Allegheny (FPR).....	* 42	36	35	31	1,180,000	MONTANA					
Pymatung (FMR).....	† 86	88	93	76	188,000	Canyon Ferry (FIMPR).....	70	69	73	70	2,043,000
Raystown Lake (FR).....	* 68	67	60	59	761,900	Fort Peck (FPR).....	† 61	55	80	61	18,910,000
Lake Wallenpaupack (PR).....	64	56	64	51	157,800	Hungry Horse (FIPR).....	56	49	57	54	3,451,000
MARYLAND						WASHINGTON					
Baltimore Municipal System (M).....	† 76	99	91	71	261,900	Ross (PR).....	* 34	23	28	47	1,052,000
NORTH CAROLINA						Franklin D. Roosevelt Lake (IP).....	* 78	50	50	99	5,022,000
Bridgewater (Lake James) (P).....	86	98	90	87	288,800	Lake Chelan (PR).....	† 23	58	31	26	676,100
Narrows (Badin Lake) (P).....	97	100	99	92	128,900	Lake Cushman (PR).....	82	85	82	79	359,500
High Rock Lake (P).....	† 74	100	81	72	234,800	Lake Merwin (P).....	96	97	97	97	245,600
SOUTH CAROLINA						IDAHO					
Lake Murray (P).....	* 91	92	80	86	1,614,000	Boise River (4 Reservoirs) (FIP).....	† 37	46	64	30	1,235,000
Lakes Marion and Moultrie (P).....	85	88	81	79	1,777,000	Coeur d'Alene Lake (P).....	† 48	54	71	95	238,500
SOUTH CAROLINA-GEORGIA						Pend Oreille Lake (FP).....	† 40	37	49	43	1,561,000
Strom Thurmond Lake (FP).....	76	86	72	71	1,730,000	IDAHO-WYOMING					
GEORGIA						Upper Snake River (8 Reservoirs) (MP).....	* 79	66	72	71	4,401,000
Burton (PR).....	86	97	84	82	104,000	WYOMING					
Sinclair (MPR).....	89	92	89	93	214,000	Boysen (FIP).....	* 70	74	64	68	802,000
Lake Sidney Lanier (FMPR).....	* 66	60	59	60	1,686,000	Buffalo Bill (IP).....	62	44	59	59	421,300
ALABAMA						Keyhole (F).....	† 15	16	44	15	193,800
Lake Martin (P).....	90	94	89	86	1,375,000	Pathfinder, Seminole, Alcovia, Kortes, Glendo, and Gurnsey Reservoirs (I).....	† 40	36	52	38	3,056,000
TENNESSEE VALLEY						COLORADO					
Clinch Projects: Norris and Melton Hill Lakes (FPR).....	57	64	52	43	2,293,000	John Martin (FIR).....	† 19	19	25	17	364,400
Douglas Lake (FPR).....	42	51	42	26	1,395,000	Taylor Park (IR).....	* 61	66	55	64	106,200
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR).....	65	68	63	57	1,012,000	Colorado-Big Thompson Project (I).....	53	48	57	53	730,300
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR).....	* 66	68	56	55	2,880,000	COLORADO RIVER STORAGE PROJECT					
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chahowee Lakes (FPR).....	63	68	62	56	1,478,000	Lake Powell; Flaming Gorge, Fontenelle, Navajo, and Blue Mesa Reservoirs (IFPR).....	† 60	64	70	60	31,620,000
WISCONSIN						UTAH-IDAHO					
Chippewa and Flambeau (PR).....	* 58	81	31	44	365,000	Bear Lake (FPR).....	† 35	36	60	33	1,421,000
Wisconsin River (21 Reservoirs) (PR).....	* 53	50	27	38	399,000	CALIFORNIA					
MINNESOTA						Folsom (FIMPR).....	59	37	61	48	1,000,000
Mississippi River Headwater System (FMR).....	* 30	33	19	25	1,640,000	Hetch Hetchy (MP).....	31	18	29	33	360,400
NORTH DAKOTA						Isabella (FIR).....	† 15	11	30	15	568,100
Lake Sakakawea (Garrison) (FIPR).....	† 60	55	78	59	22,700,000	Pine Flat (FIR).....	† 19	15	54	14	1,001,000
SOUTH DAKOTA						Clear Eagle Lake (Lewiston) (FP).....	† 32	42	80	27	2,438,000
Angostura (I).....	79	47	77	76	130,770	Lake Alvin (P).....	* 75	72	57	71	1,036,000
Belle Fourche (I).....	† 38	33	62	33	185,200	Lake Berryessa (FIMRW).....	† 39	44	86	37	1,600,000
Lake Francis Case (FIP).....	† 78	74	84	76	4,589,000	Millerton Lake (FI).....	* 71	52	64	55	503,200
Lake Oahe (FIP).....	† 66	61	72	65	22,240,000	Shasta Lake (FIPR).....	† 53	44	82	43	4,377,000
Lake Sharpe (FIP).....	102	100	101	102	1,697,000	CALIFORNIA-NEVADA					
Lewis and Clark Lake (FIP).....	89	78	90	90	432,000	Lake Tahoe (IMPRW).....	† 0	0	54	0	744,600
ARIZONA						NEVADA					
San Carlos (IP).....	* 75	45	31	73	935,100	Rye Patch (I).....	† 8	6	61	5	194,300
Salt and Verde River System (IMPR).....	* 85	83	55	80	2,019,100	ARIZONA-NEVADA					
NEW MEXICO						Lake Mead and Lake Mohave (FIMP).....	* 78	77	70	77	27,970,000
Conchas (FIR).....	* 97	60	82	95	315,700	ARIZONA					
Elephant Butte and Caballo (FIPR).....	* 80	65	43	81	2,394,000	San Carlos (IP).....	* 75	45	31	73	935,100
						Salt and Verde River System (IMPR).....	* 85	83	55	80	2,019,100

¹ 1 acre-foot = 0.04356 million cubic feet = 0.326 million gallons = 0.504 cubic feet per second per day.² Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage).

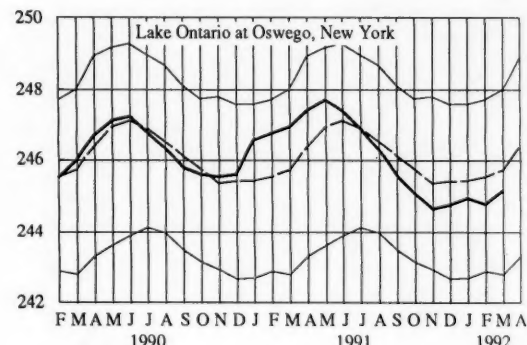
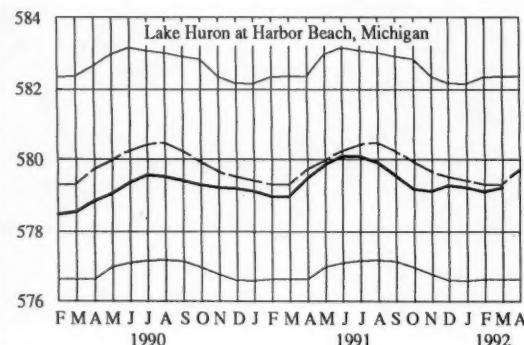
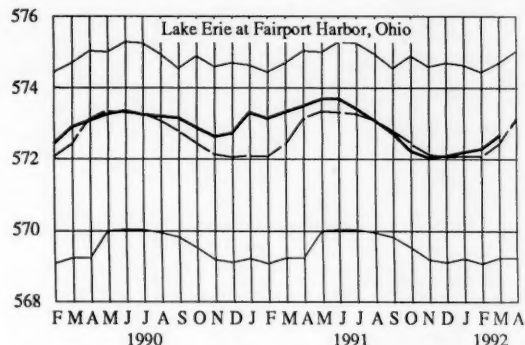
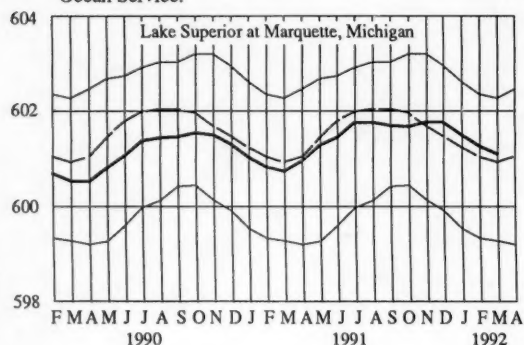
* Above-average range

† Below-average range

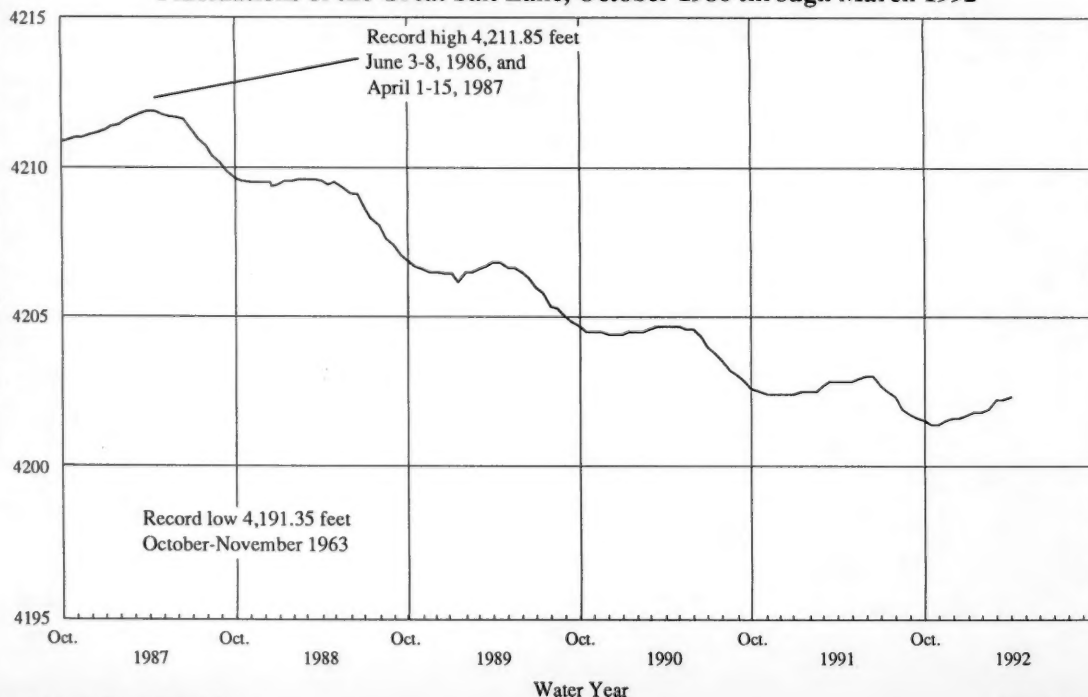
GREAT LAKES ELEVATIONS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period. Data from National Ocean Service.

ELEVATION, IN FEET ABOVE NATIONAL GEODETIC VERTICAL DATUM OF 1929

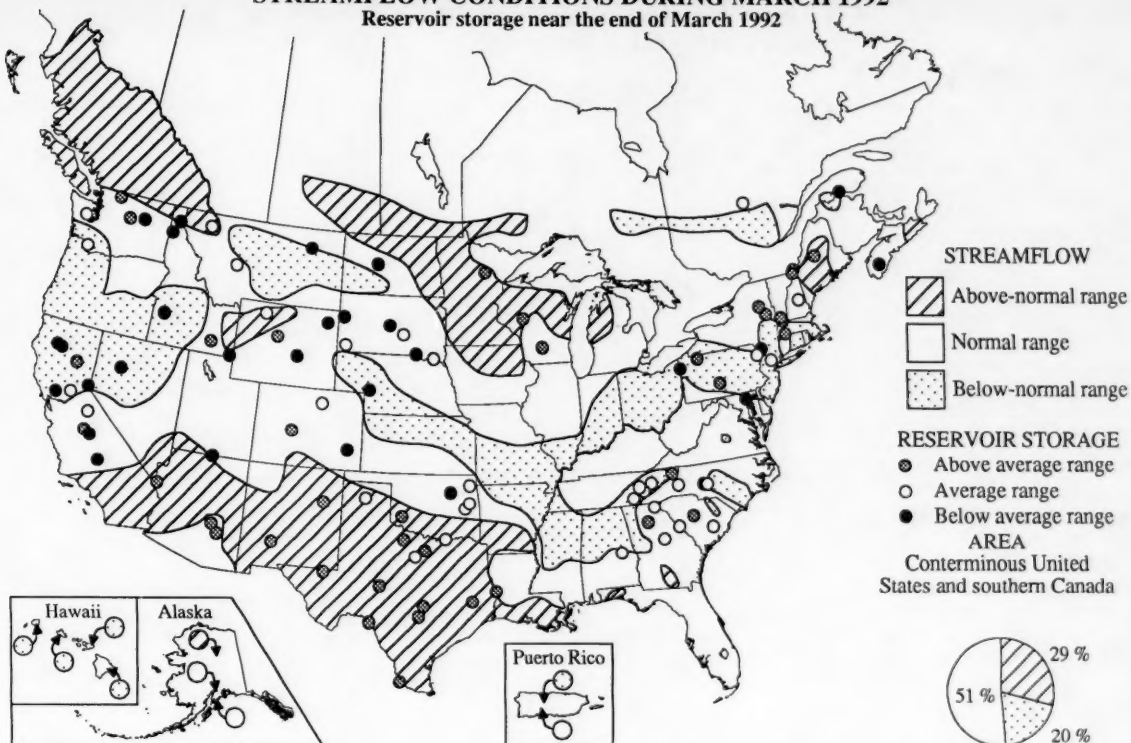


Fluctuations of the Great Salt Lake, October 1986 through March 1992



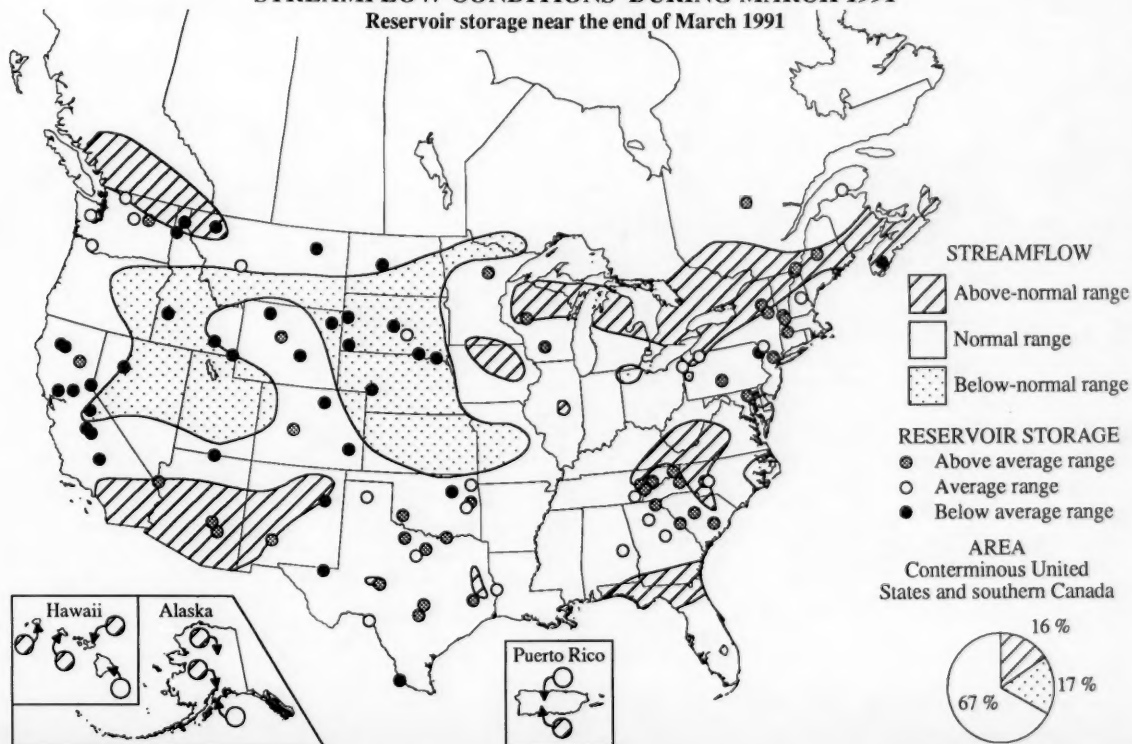
STREAMFLOW CONDITIONS DURING MARCH 1992

Reservoir storage near the end of March 1992



STREAMFLOW CONDITIONS DURING MARCH 1991

Reservoir storage near the end of March 1991

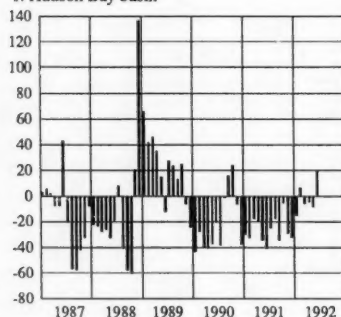


March 1992

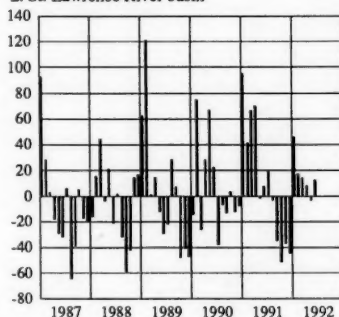
MONTHLY DEPARTURE OF ACTUAL STREAMFLOW (OCTOBER 1986-MARCH 1992) FROM MEDIAN STREAMFLOW (1951-80)

PERCENT DEPARTURE FROM 1951-80 MEDIAN STREAMFLOW

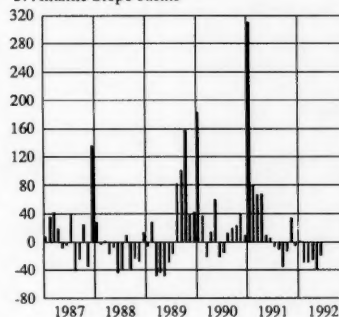
1. Hudson Bay basin



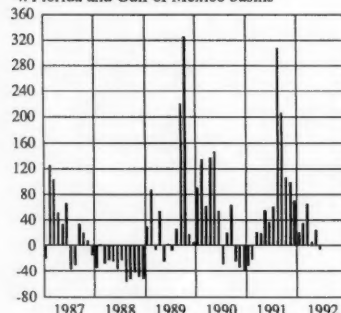
2. St. Lawrence River basin



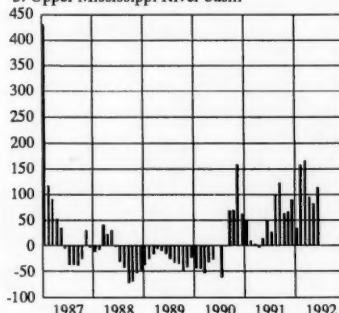
3. Atlantic Slope basins



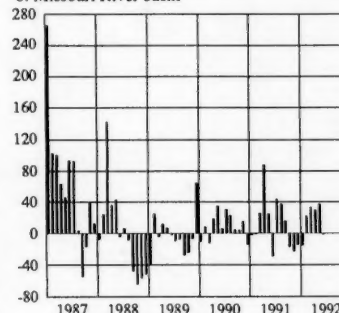
4. Florida and Gulf of Mexico basins



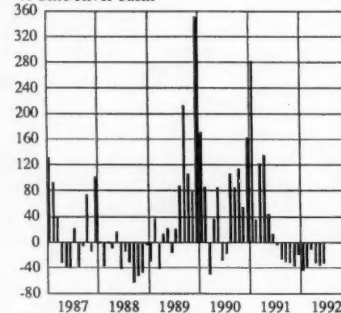
5. Upper Mississippi River basin



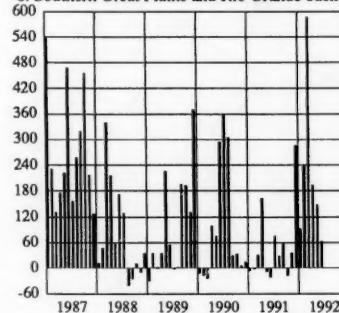
6. Missouri River basin



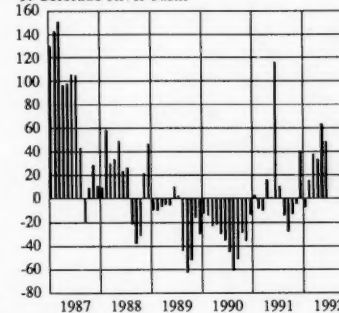
7. Ohio River basin



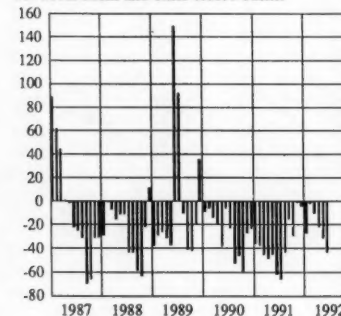
8. Southern Great Plains and Rio Grande basins



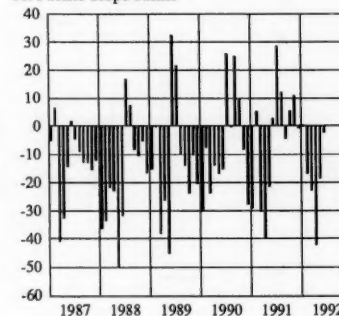
9. Colorado River basin



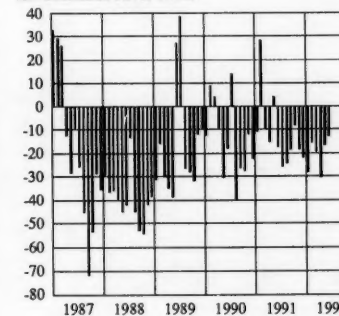
10. Great basin and other closed basins



11. Pacific Slope basins



12. Columbia River basin



WATER YEAR

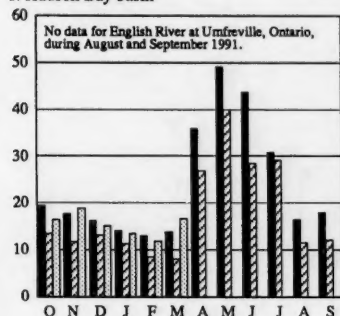
WATER YEAR

WATER YEAR

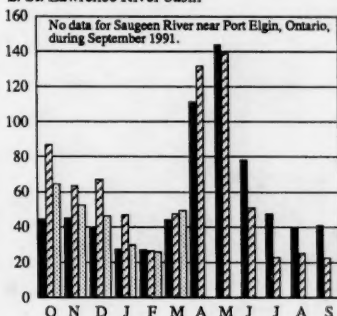
ACTUAL MONTHLY STREAMFLOW, 1991 AND 1992 WATER YEARS, COMPARED WITH MEDIAN MONTHLY STREAMFLOW, 1951-80

MONTHLY MEAN DISCHARGE, THOUSANDS OF CUBIC FEET PER SECOND

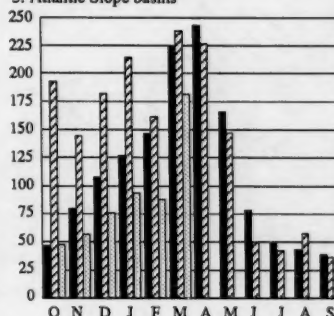
1. Hudson Bay basin



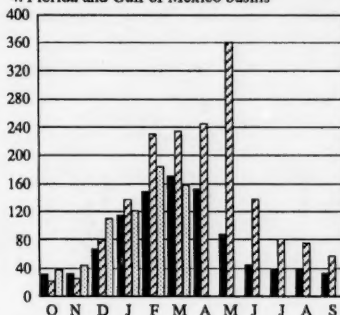
2. St. Lawrence River basin



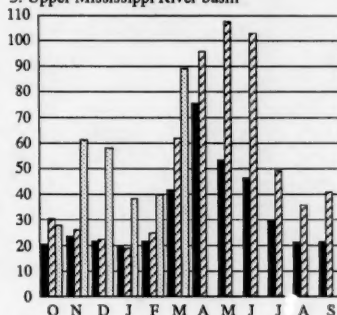
3. Atlantic Slope basins



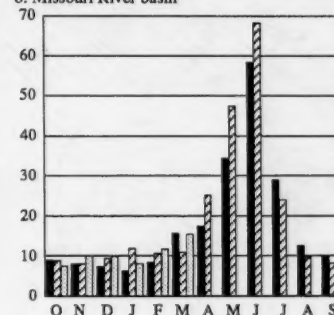
4. Florida and Gulf of Mexico basins



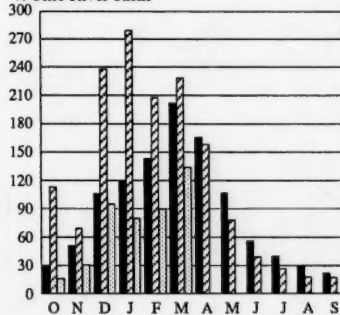
5. Upper Mississippi River basin



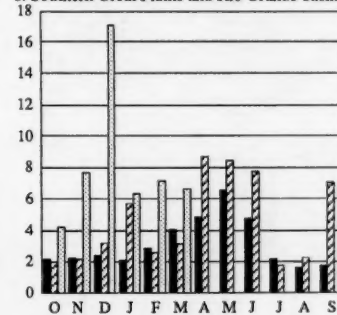
6. Missouri River basin



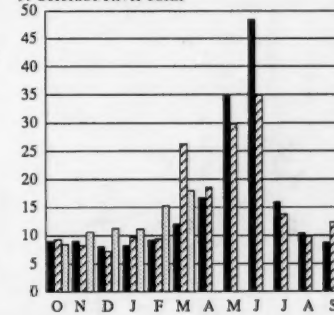
7. Ohio River basin



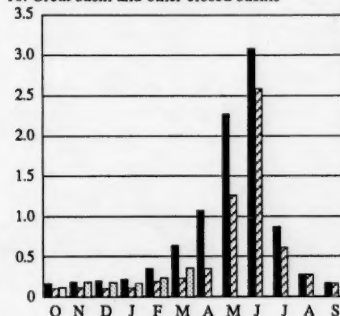
8. Southern Great Plains and Rio Grande basins



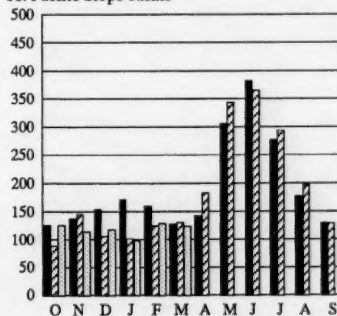
9. Colorado River basin



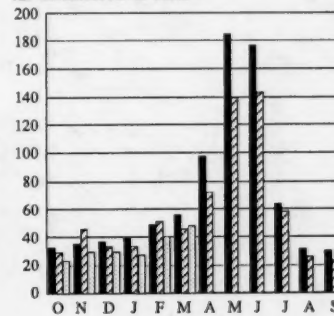
10. Great basin and other closed basins



11. Pacific Slope basins



12. Columbia River basin



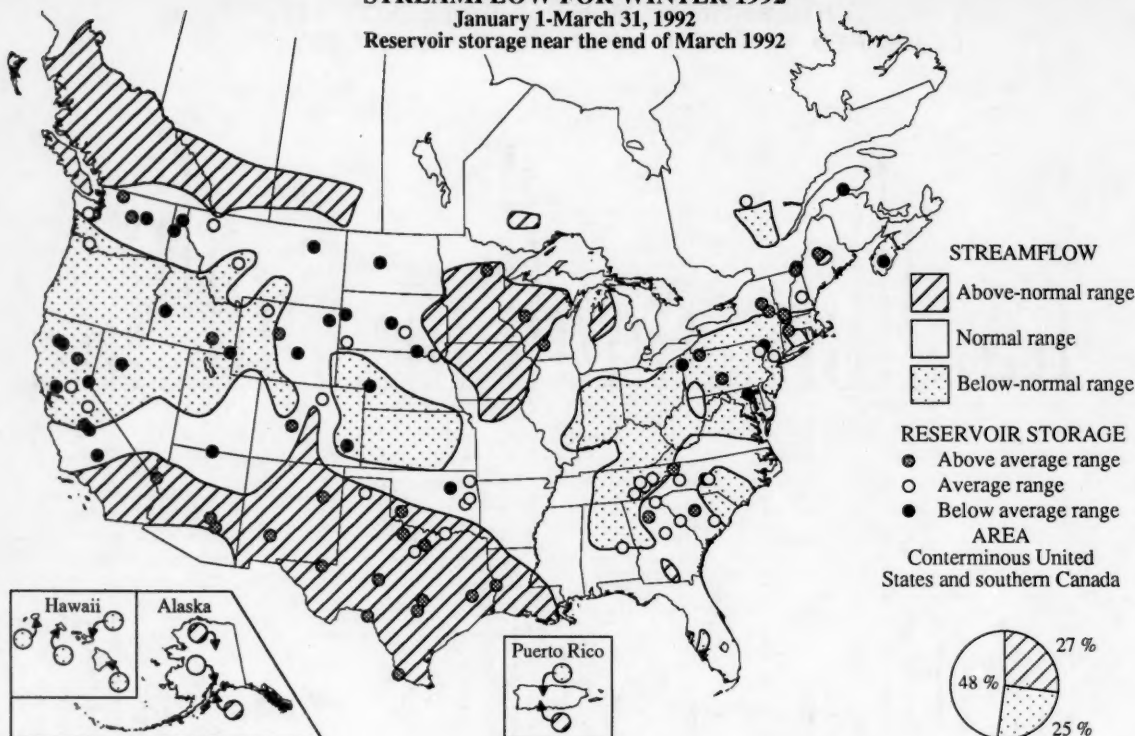
■ 1951-80 Median

▨ 1991 Water Year

▤ 1992 Water Year

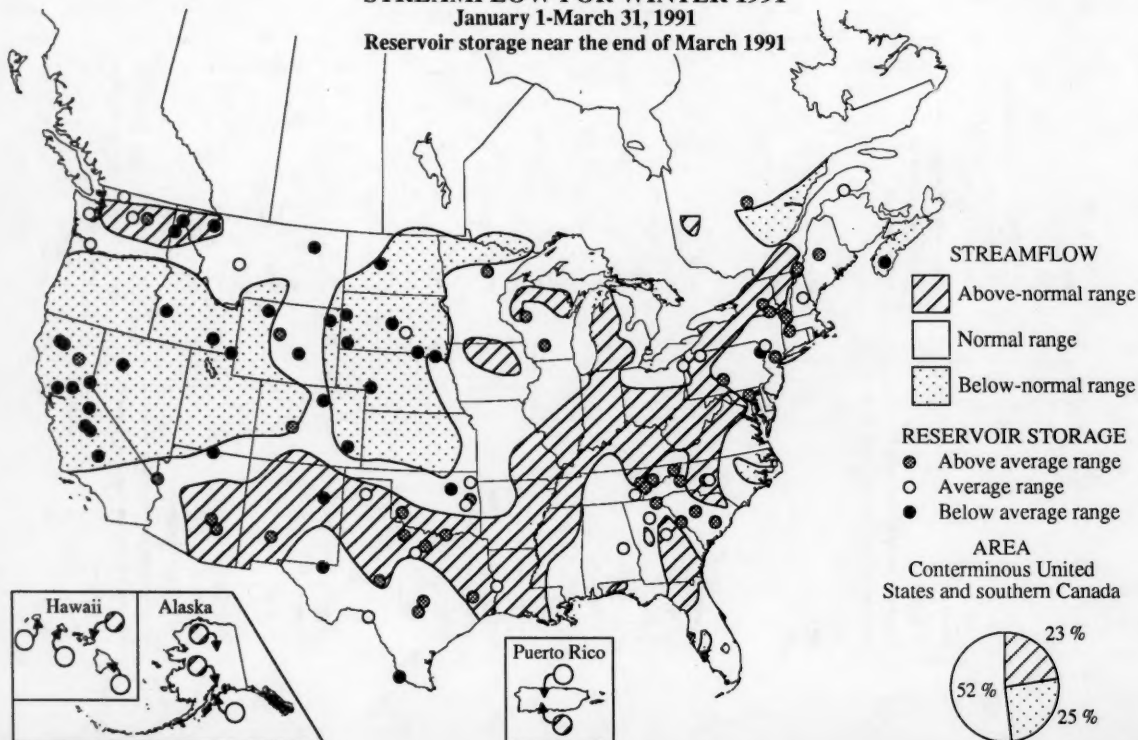
STREAMFLOW FOR WINTER 1992

January 1-March 31, 1992
Reservoir storage near the end of March 1992



STREAMFLOW FOR WINTER 1991

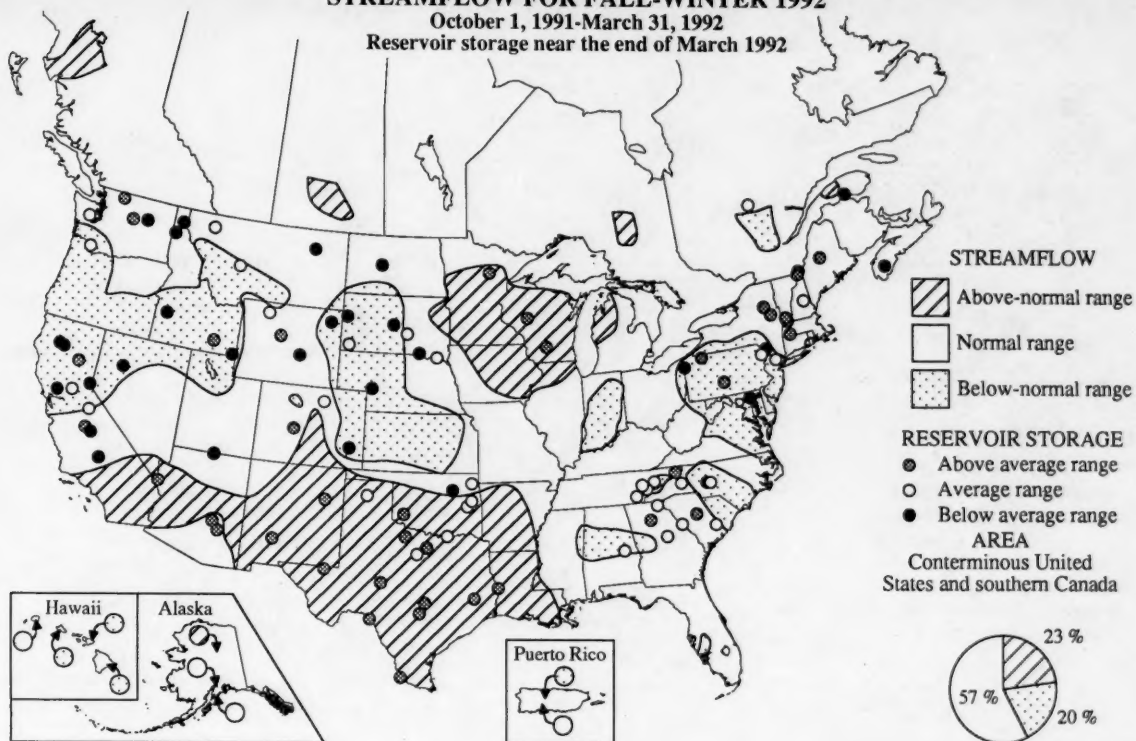
January 1-March 31, 1991
Reservoir storage near the end of March 1991



STREAMFLOW FOR FALL-WINTER 1992

October 1, 1991-March 31, 1992

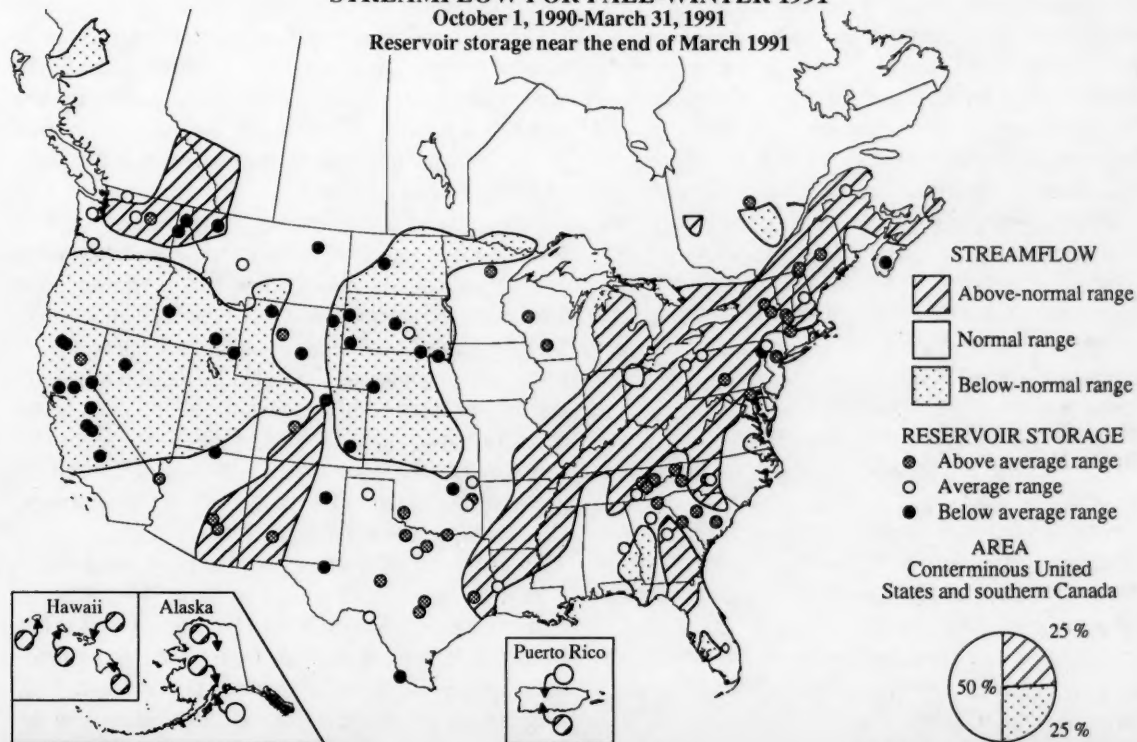
Reservoir storage near the end of March 1992



STREAMFLOW FOR FALL-WINTER 1991

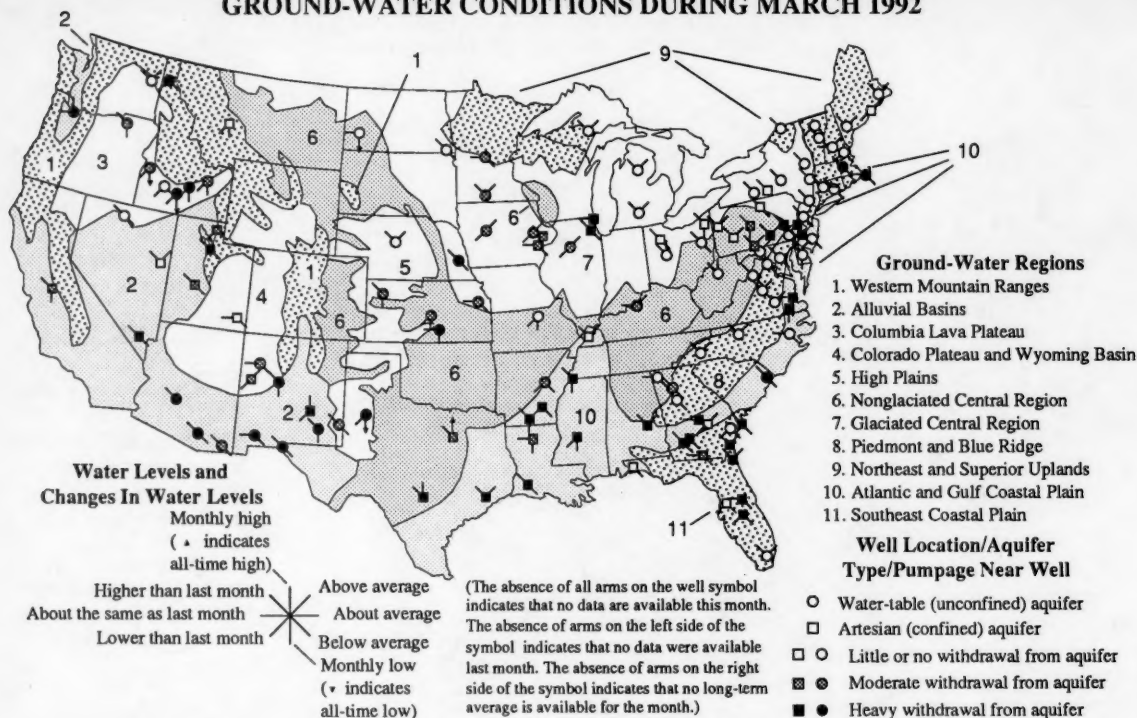
October 1, 1990-March 31, 1991

Reservoir storage near the end of March 1991



March 1992

GROUND-WATER CONDITIONS DURING MARCH 1992



New extremes occurred at 32 ground-water index stations (see table on page 21) during March—27 lows (including 4 all-time) and 5 highs (including 1 all-time)—compared with 32 new extremes last month. Graphs showing water levels at seven stations—for wells in the Western Mountain Ranges region in Idaho, the Alluvial Basins region in New Mexico, the High Plains region in Kansas, the Nonglaciaded Central region in Kentucky, the Glaciaded Central region in Michigan, the Atlantic and Gulf Coastal Plain region in North Carolina, and the Northeast and Superior Uplands region in New Hampshire—for the past 26 months are on page 23.

Ground-water levels in the Western Mountain Ranges region were above last month's levels in Washington, and below last month's in Idaho and Montana. Levels were above long-term averages in Washington, and below average in Idaho and Montana. A March low occurred in the well in Montana.

In the Alluvial Basins region, levels were at or above last month's levels except in Utah and New Mexico where they were mixed. Levels were above long-term averages in Oregon, mixed in Nevada and New Mexico, and below average elsewhere in the Region. March lows occurred in wells in California and New Mexico. March highs occurred in wells in Oregon and New Mexico.

In the Columbia Lava Plateau region, water levels were below last month's in Idaho and above last month's level in Oregon. Levels were below long-term averages throughout the Region. An all-time low occurred in the Snake River Plain aquifer well near Eden, Idaho, and the all-time low was equalled in the Shallow alluvium aquifer well near Meridian, Idaho. March lows occurred in two wells in Idaho and one in Oregon.

Ground-water levels were at or below last month's levels throughout the Colorado Plateau and Wyoming Basin region. Levels were below long-term average in Utah, and mixed with respect to average in New Mexico.

In the High Plains region, ground-water levels were above last month's levels except in Texas where the level was below last month's. Levels were below long-term averages except in Nebraska where level was above average. A March low occurred in the well in Kansas (see graph on page 23) and an all-time low level occurred in the Ogallala aquifer near Lubbock, Texas.

Ground-water levels in the Nonglaciaded Central region were at or below last month's levels in North Dakota, Kansas, Missouri, Kentucky, and Georgia, and above last month's levels elsewhere. Water levels were above long-term averages in Texas, Kentucky, Maryland, and West Virginia; mixed in Pennsylvania; and below average

WATER LEVELS IN KEY OBSERVATION WELLS IN SOME REPRESENTATIVE AQUIFERS IN THE CONTERMINOUS UNITED STATES-MARCH 1992

GROUND-WATER REGION Aquifer and Location	Aquifer type and local aquifer pumpage	Depth of well in feet	Water level in feet below land- surface datum	Departure from average in feet	Net change in water level in feet since:		Year records began	Remarks
					Last month	Last year		
WESTERN MOUNTAIN RANGES (1)								
Rathdrum Prairie aquifer near Athol, northern Idaho	●	485	462.3	-0.3	-0.6	-0.6	1929	
ALLUVIAL BASINS (2)								
Alluvial valley fill aquifer in Steptoe Valley, Nevada	□	122	7.75	4.00	.25	-.21	1949	
Valley fill aquifer, Elfrida area near Douglas, Arizona	●	124	101.26	-19.03	.40	-.84	1947	
Hueco bolson aquifer at El Paso, Texas	●	640	270.47	-20.32	.56	.46	1964	
COLUMBIA LAVA PLATEAU (3)								
Snake River Plain aquifer near Eden, Idaho	●	208	134.1	-12.0	-1.6	-4.1	1962	All-time low
Columbia River basalt aquifer, Pendleton, Oregon	●	1,501	221.52	-35.56	1.77	-4.02	1965	March low
COLORADO PLATEAU AND WYOMING BASIN (4)								
Dakota aquifer near Blanding, Utah	□	140	50.35	-3.49	.06	-2.48	1960	
HIGH PLAINS (5)								
Ogallala aquifer near Colby, Kansas	●	175	130.38	-11.64	.25	-.84	1947	March low
Southern High Plains aquifer, Lovington, New Mexico	●	212	59.00	-5.13	.10	.60	1971	
NONGLACIATED CENTRAL REGION (6)								
Sentinel Butte aquifer near Dickinson, North Dakota	○	160	21.79	-3.61	-.01	-.65	1968	All-time low
Sand and gravel Pleistocene aquifer near Valley Center, Kansas	●	54	21.06	-3.41	.02	-.66	1937	March low
Glacial outwash sand and gravel aquifer near Louisville, Kentucky	●	94	18.07	6.40	-.02	-1.05	1945	
Upper Pennsylvanian aquifer in the Central Appalachians Plateau near Glenville, West Virginia	○	25	12.17	3.65	.23	2.51	1953	March high
GLACIATED CENTRAL REGION (7)								
Fluvial sand and gravel aquifer, Platte River Valley, near Ashland, Nebraska	●	12	5.81	-1.21	.51	.26	1933	
Sheyenne Delta aquifer near Wyndmere, North Dakota	○	40	7.32	-.88	1.09	1.00	1963	
Pleistocene (glacial drift) aquifer at Princeton in northern Illinois	●	29	6.00	2.85	-.25	-.50	1942	
Shallow drift aquifer near Roscommon in north-central part of Lower Peninsula, Michigan	○	14	3.75	.76	.36	.21	1934	
Silurian-Devonian carbonate aquifer near Dola, Ohio	□	51	7.15	-.10	1.11	-.59	1954	
PIEDMONT AND BLUE RIDGE (8)								
Water-table aquifer in Petersburg Granite, southeastern Piedmont, Colonial Heights, Virginia	○	100	13.86	.41	2.56	.76	1939	
Weathered granite aquifer, western Piedmont, Mocksville area, North Carolina	○	31	15.49	1.23	.54	-1.86	1981	
Surficial aquifer at Griffin, Georgia	○	30	14.87	-1.77	2.09	.98	1943	
NORTHEAST AND SUPERIOR UPLANDS (9)								
Pleistocene glacial outwash aquifer, at Camp Ripley, near Little Falls, Minnesota	●	59	15.45	-1.81	.06	.34	1949	
Glacial outwash sand aquifer at Oxford, Maine	○	39	7.58	1.13	1.21	.41	1980	
Shallow sand aquifer (glacial deposits), Acton, Massachusetts	●	34	18.70	-.45	.15	.92	1965	
Pleistocene sand aquifer near Morrisville, Vermont	○	50	18.97	-.61	-.23	-.50	1966	
ATLANTIC AND GULF COASTAL PLAIN (10)								
Columbia deposits aquifer near Camden, Delaware	○	11	8.16	-2.04	.69	-1.34	1950	March low
Memphis sand aquifer near Memphis, Tennessee	■	384	106.20	-15.51	.17	.17	1940	March low
Eutaw aquifer in the City of Montgomery, Alabama	■	270	18.8	.2	1.0	6.6	1952	
Evangeline aquifer at Houston, Texas	■	1,152	287.74	8.90	2.18	17.50	1978	
SOUTHEAST COASTAL PLAIN (11)								
Upper Floridan aquifer on Cockspur Island, Savannah area, Georgia	■	348	33.46	-6.73	.44	2.80	1956	
Upper Floridan aquifer, Jacksonville, Florida	■	905	-23.4	-5.0	.2	2.0	1930	
Biscayne aquifer near Homestead, Florida	○	20	6.89	.77	.22	1.20	1932	

elsewhere. March lows occurred in wells in Kansas, Missouri, and Pennsylvania, and an all-time low occurred in the Sentinel Butte aquifer near Dickinson, North Dakota. March highs occurred in Texas and West Virginia, and an all-time high occurred in the well in the Twin Mountains (Trinity) aquifer near Hurst/Fort Worth, Texas.

Levels in the Glaciated Central region were at or above

last month's except in Iowa and Illinois where they were mixed. Levels were above long-term averages in Minnesota, Michigan, and Pennsylvania; mixed in Iowa and Illinois; and below average elsewhere. March lows occurred in wells in Iowa, Illinois, and Ohio.

Levels were above last month's levels throughout the Piedmont and Blue Ridge region. Levels were below long-

NEW EXTREMES DURING MARCH AT GROUND-WATER INDEX STATIONS

WRD Station Identification Number	GROUND-WATER REGION Aquifer and Location	Aquifer type and local aquifer pumpage	Depth of well	Years of record	End-of-month water level in feet below land surface datum		
					Previous March Record		
					Average	Extreme (year)	March 1992
LOW WATER LEVELS							
WESTERN MOUNTAIN RANGES							
463906112043901	Cretaceous aquifer near Helena, Montana	□	110	16	31.22	35.63 (1991)	36.85
ALLUVIAL BASINS							
324340104231701	Roswell Basin shallow aquifer at Dayton, New Mexico	●	250	40	91.82	122.75 (1991)	123.13
351051106395301	Basin-fill aquifer at Albuquerque, New Mexico	●	980	8	31.84	35.36 (1991)	35.79
382444121123301	Mehrten aquifer near Wilton, California	■	300	5	130.96	134.77 (1991)	136.43
COLUMBIA LAVA PLATEAU							
423659114111601	Snake River Plain aquifer near Eden, Idaho	●	208	29	122.1	130.0 (1991)	134.1
424953113412801	Snake River Plain aquifer near Rupert, Idaho	●	194	41	150.8	159.1 (1991)	161.5
432700112470801	Snake River Plain aquifer near Atomic City, Idaho	●	636	42	584.8	587.5 (1982)	588.1
433852116244801	Shallow alluvium aquifer near Meridian, Idaho	●	32	56	10.2	12.2 (1935)	212.3
453934118491701	Columbia River basalts aquifer at Pendleton, Oregon	●	1,501	22	185.96	217.90 (1991)	221.52
HIGH PLAINS							
341010102240801	Ogallala aquifer near Lubbock, Texas	●	202	41	52.19	91.45 (1991)	193.52
392329101040201	Ogallala aquifer near Colby, Kansas	●	175	45	118.74	129.54 (1991)	130.38
NONGLACIATED CENTRAL REGION							
375039097234201	Sand and gravel Pleistocene aquifer near Valley Center, Kansas	●	54	54	17.65	20.40 (1991)	21.06
375749091475001	Ozark aquifer near Rolla, Missouri	○	450	4	346.59	348.64 (1990)	351.65
375810097324301	Equus aquifer near Halstead, Kansas	●	57	52	22.62	36.55 (1991)	39.63
404140077354001	Carbonate aquifer at Roseanne, Pennsylvania	■	200	9	50.39	58.50 (1990)	62.94
465755102410701	Sentinel Butte aquifer near Dickinson, North Dakota	○	160	22	18.18	21.13 (1991)	212.79
GLACIATED CENTRAL REGION							
395118082573300	Glacial-drift aquifer near Reese, Ohio	○	53	45	10.73	12.59 (1990)	12.72
411401081025000	Pennsylvanian sandstone aquifer near Windham, Ohio	□	55	45	19.53	22.48 (1954)	22.96
415534091251502	Cambrian Ordovician aquifer at Mt. Vernon, Iowa	■	1,557	4	336.07	338.48 (1991)	341.21
422803087475302	Lower Mount Simon aquifer at Illinois Beach State Park, Illinois	■	2,264	4	201.70	204.27 (1990)	205.76
ATLANTIC AND GULF COASTAL PLAIN							
321945090152201	Sparta aquifer system at Jackson, Mississippi	■	852	47	255.58	307.02 (1991)	311.56
322357092341701	Sparta aquifer near Ruston, Louisiana	●	703	17	223.42	236.38 (1991)	237.30
331438092411901	Sparta aquifer near El Dorado, Arkansas	●	540	36	327.04	350.06 (1991)	370.23
350900089482300	Memphis sand aquifer near Memphis, Tennessee	●	384	52	90.69	106.05 (1988)	106.20
364059076544901	Middle Potomac aquifer at Franklin, Virginia	●	305	31	169.23	208.94 (1991)	213.59
372506076511703	Upper Potomac aquifer near Toano, Virginia	■	401	5	158.97	162.05 (1991)	163.57
390607075331501	Columbia deposits aquifer near Camden, Delaware	○	11	27	6.12	8.11 (1956)	8.16
HIGH WATER LEVELS							
ALLUVIAL BASINS							
332615104303601	Roswell Basin artesian aquifer at Roswell, New Mexico	■	324	25	55.01	41.80 (1991)	36.30
452938122254801	Troutdale aquifer near Portland, Oregon	●	715	28	98.45	87.44 (1991)	87.40
NONGLACIATED CENTRAL REGION							
292845098255401	Edwards aquifer at San Antonio, Texas	■	874	41	58.88	40.92 (1977)	35.10
324842097102901	Twin Mountains (Trinity) aquifer near Hurst/Fort Worth, Texas	●	667	13	457.32	443.30 (1991)	349.56
385604080495901	Upper Pennsylvanian aquifer near Glenville, West Virginia	○	25	38	15.82	13.99 (1990)	12.17

¹ All-time month-end low.² Equal to previous all-time month-end low.³ All-time month-end high.

term averages in Pennsylvania, New Jersey, Maryland, and Georgia; above long-term averages in North Carolina; and mixed in Virginia.

In the Northeast and Superior Uplands region, ground-water levels were at or below last month's levels in Minnesota and New Hampshire; mixed with respect to last month's levels in Maine and Vermont and above last month's levels elsewhere. Water levels were above long-term averages in Michigan and Maine; mixed with respect to average in New Hampshire; and at or below average elsewhere.

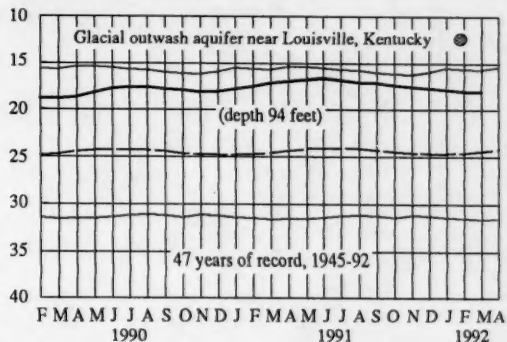
In the Atlantic and Gulf Coastal Plain region, water levels were at or below last month's in Massachusetts,

New Jersey, Virginia, North Carolina, Georgia, Florida, and Mississippi; mixed in Arkansas; and generally above last month's levels elsewhere. Ground-water levels were above long-term averages in Alabama, Kentucky, and Texas; and below average elsewhere. March lows occurred in wells in Delaware, Virginia, Mississippi, Tennessee, Arkansas, and Louisiana. An all-time low occurred in the well in the Middle Potomac aquifer at Franklin, Virginia.

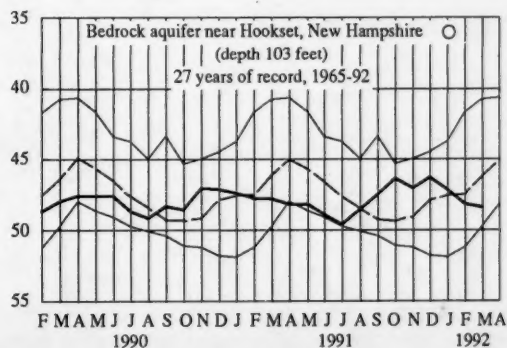
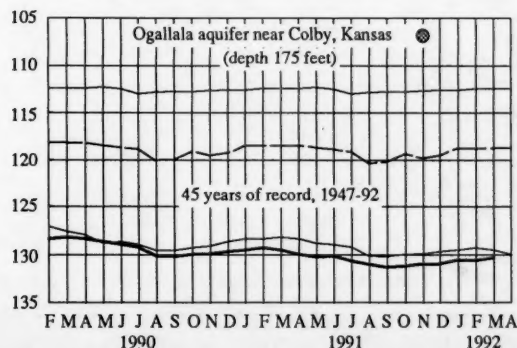
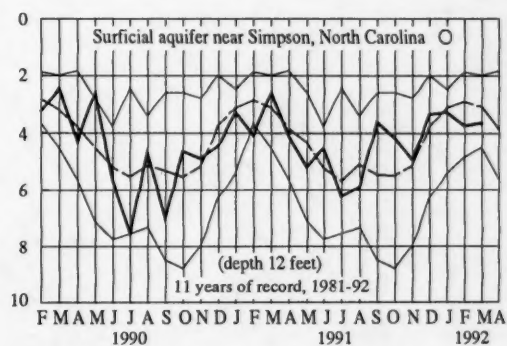
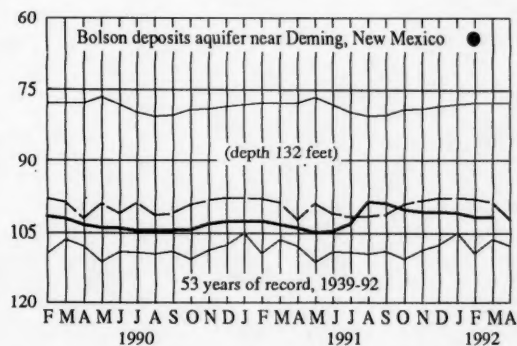
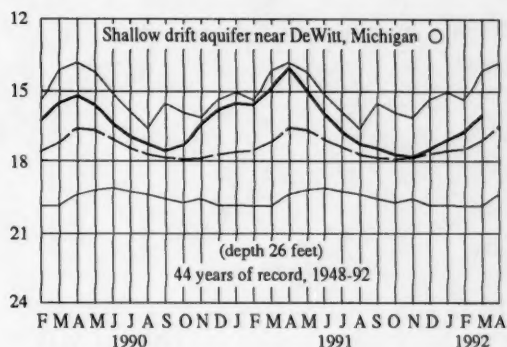
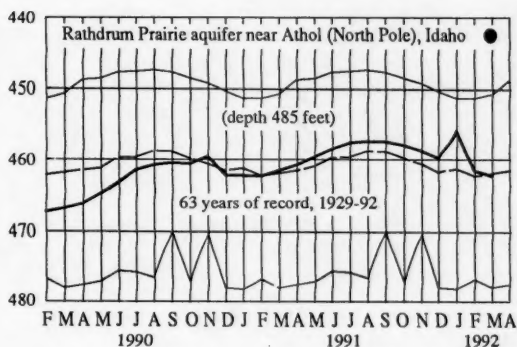
In the Southeast Coastal Plain region, water levels were mixed with respect to last month's levels and mixed with respect to long-term average throughout the Region.

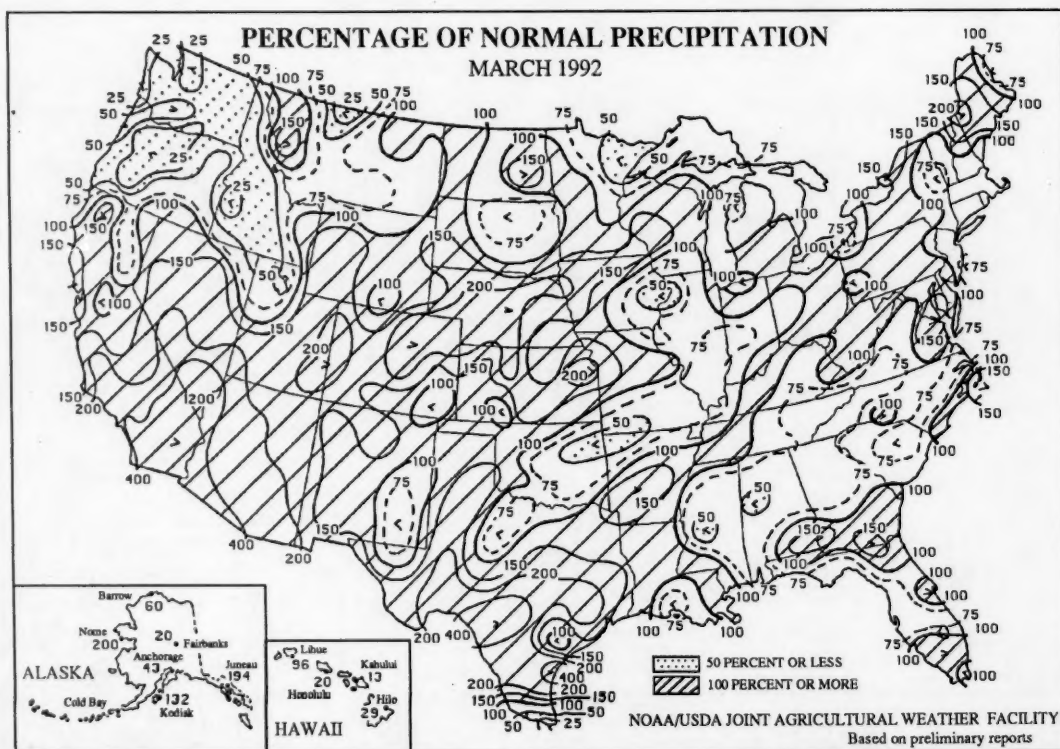
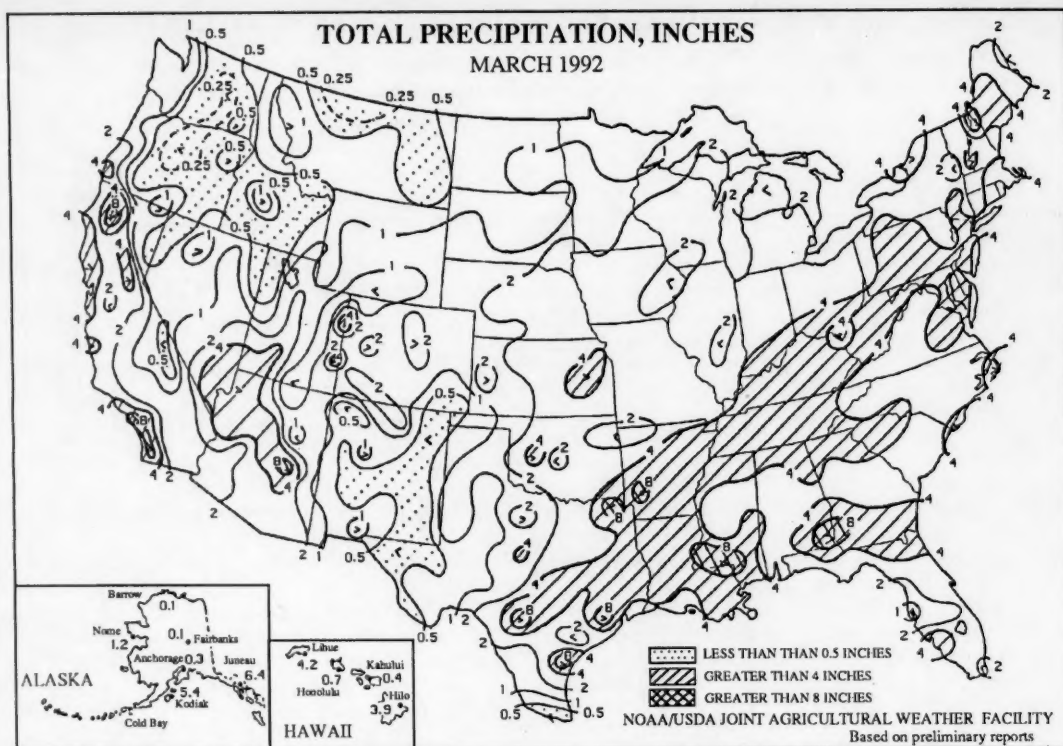
MONTHEND GROUND-WATER LEVELS IN SELECTED WELLS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates average of monthly levels in previous years. Heavy line indicates level for current period.



WATER LEVEL, FEET BELOW LAND-SURFACE DATUM





(From Weekly Weather and Crop Bulletin, NOAA/USDA Joint Agricultural Weather Facility)

UNITED STATES MARCH CLIMATE IN HISTORICAL PERSPECTIVE

Preliminary data for March 1992 indicate that temperature averaged across the contiguous United States was much above the long-term mean, ranking March 1992 as the 11th warmest on record. March temperatures have been consistently warmer than normal for the last eight years.

Areally-averaged precipitation for the nation was above normal for March (first graph below, left), ranking March 1992 as the 36th wettest (63rd driest) March on record. The preliminary value for precipitation is estimated to be accurate to within 0.15 inches and the confidence interval is plotted below as a '+'. About one-eighth (12.8%) of the country experienced much wetter than normal conditions and 8.3% was much drier than normal.

Historical precipitation is shown in a different way in the second graph below on the left. The March precipitation for each climate division in the contiguous U.S. was first standardized using the gamma distribution over the 1951-80 period. These gamma-standardized values were then weighted by area and averaged to determine a national standardized precipitation value. Negative values are dry, positive are wetter than the mean. This index gives a more accurate indication of how precipitation across the country compares to the local normal climate. The areally-weighted mean standardized national precipitation ranked 1992 as the 63rd driest (36th wettest) March on record.

The temperature and precipitation rankings for March 1992 for the nine climatically homogeneous regions show that except for the Northeast region, which had their 29th coolest March, temperatures were in the mid and upper thirds of the historical distribution for warmth. March 1992 was the second warmest March in the 98-year record for the Northwest region. Precipitation rankings varied considerably. The Southwest region had the fourth wettest March on record while at the other extreme, the Northwest region recorded the eighth driest March.

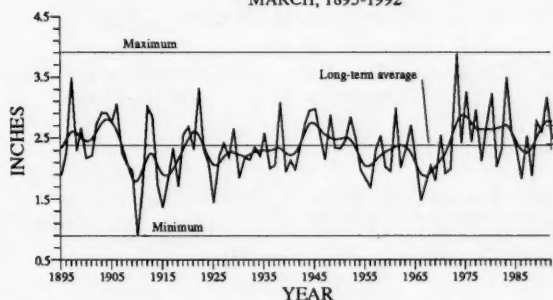
For the year thus far, the nation as a whole has been unusually warm, with January-March 1992 ranking as the second warmest such period on record.

For the nation, the year thus far shows areally-averaged precipitation near normal (first graph below, right). When the local normal climate is taken into account, the year to date ranks as the 45th wettest such period on record (second graph below, right). Long-term drought conditions on a national scale increased slightly during March. The percent area of the contiguous U.S. experiencing long-term drought (as defined by the Palmer Drought Index) rose to about fourteen percent. At the same time, the percent area experiencing long-term wet conditions increased to around 18 percent.

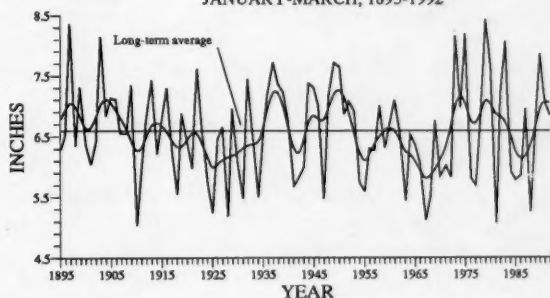
Over seventeen percent of the nation suffered from below normal precipitation for the January-March period while 14.8% experienced much above normal precipitation. Texas continued to be wet reporting the wettest January through March period on record while Arizona, Louisiana, and Nebraska were all in the top ten wettest since records began in 1895. Two states (Montana and Wyoming) had their second driest January-March period on record while four other states had their tenth driest or drier such period.

Eight River Basin areas were in the top third wettest of the historical distribution for the hydrologic year, now six months old. Topping the list is the Texas Gulf Coast Basin which had their third wettest October-March period on record. The Rio Grande Basin had their fifth wettest such period and the Lower Colorado and Upper Mississippi Basins had their seventh and eighth wettest such periods, respectively, on record. On the other hand, the driest was the Pacific Northwest Basin with the twelfth driest hydrologic year to date while the Mid-Atlantic and South Atlantic Gulf Basins were also in the bottom third of the historical distribution.

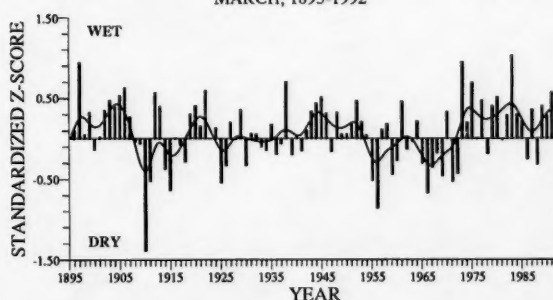
U.S. NATIONAL PRECIPITATION
MARCH, 1895-1992



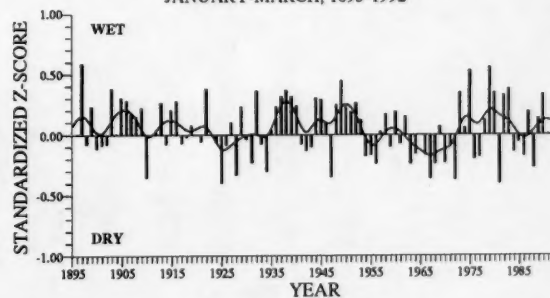
U.S. NATIONAL PRECIPITATION
JANUARY-MARCH, 1895-1992



U.S. NATIONAL WEIGHTED MEAN PRECIPITATION INDEX
MARCH, 1895-1992

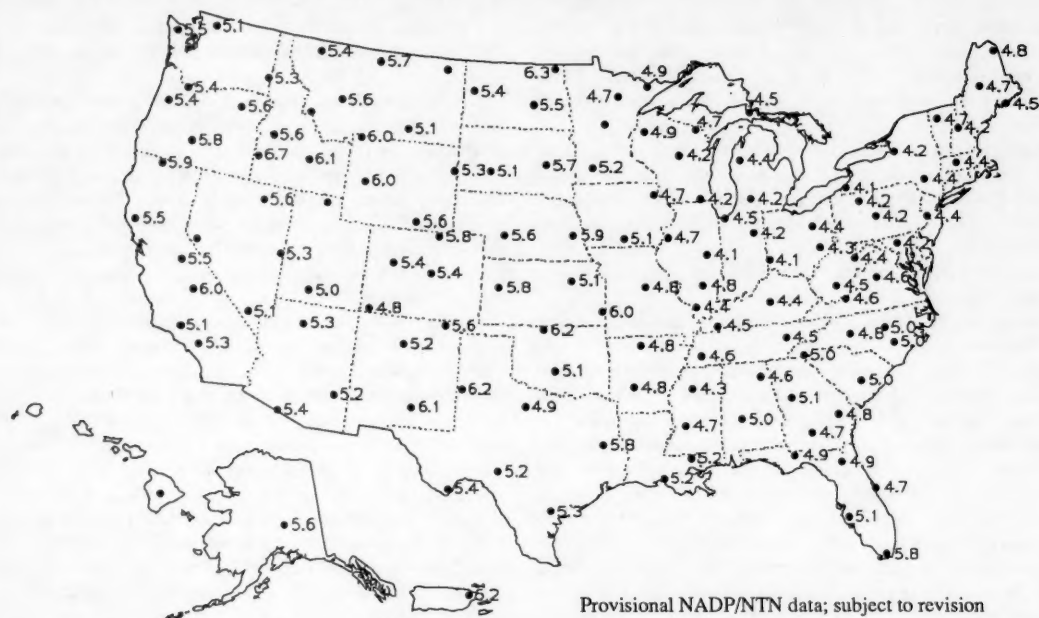


U.S. NATIONAL WEIGHTED MEAN PRECIPITATION INDEX
JANUARY-MARCH, 1895-1992



(From *Climate Variations Bulletin*, National Climatic Data Center, NOAA)

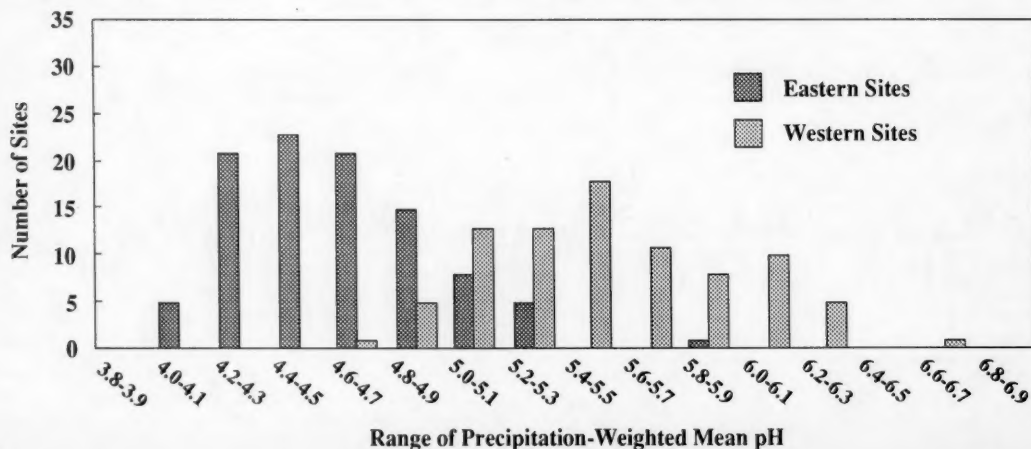
pH of Precipitation for February 24-March 22, 1992



Current pH data shown on the map (• 4.9) are precipitation-weighted means calculated from preliminary laboratory results provided by the NADP/NTN Central Analytical Laboratory at the Illinois State Water Survey and are subject to change. The 128 points (•) shown on this map represent a subset of all sites chosen to provide relatively even geographic spacing. Absence of a pH value at a site indicates either that there was no precipitation or that data for the site did not meet preliminary screening criteria for this provisional report.

A list of the approximately 200 sites comprising the total Network and additional data for the sites are available from the NADP/NTN Coordination Office, Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO 80523.

Distribution of precipitation-weighted mean pH for all NADP/NTN sites having one or more weekly samples for February 24-March 22, 1992. The East/West dividing line is at the western borders of Minnesota, Iowa, Missouri, Arkansas, and Louisiana.



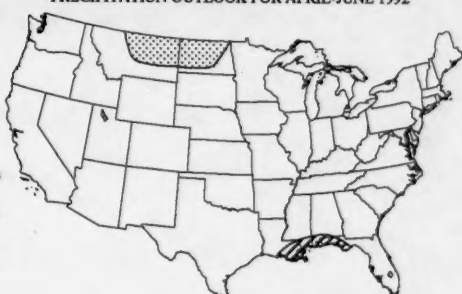
TEMPERATURE OUTLOOK FOR APRIL-JUNE 1992



PRECIPITATION OUTLOOK FOR APRIL-JUNE 1992

OUTLOOK

- Likely above median
 About equal chances
 Likely below median



From *Monthly and Seasonal Weather Outlook* prepared and published by the National Weather Service

NATIONAL WATER CONDITIONS

MARCH 1992

Based on reports from the Canadian and U.S. Field offices; completed April 23, 1992

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EXPLANATION OF DATA (Revised December 1990)

Cover map shows generalized pattern of streamflow for the month based on provisional data from 186 index gaging stations—18 in Canada, 166 in the United States, and 2 in the Commonwealth of Puerto Rico. Alaska, Hawaii, and Puerto Rico inset maps show streamflow only at the index gaging stations that are located near the point shown by the arrows. Classifications on map are based on comparison of streamflow for the current month at each index station with the flow for the same month in the 30-year reference period, 1951-80. Shorter reference periods are used for one Canadian index station, two Kansas index stations, and the Puerto Rico index stations because of the limited records available.

The **streamflow ranges map** shows where streamflow has persisted in the above- or below-normal range from last month to this month and also where streamflow is in the above- or below-normal range this month after being in a different range last month. Three **pie charts** show: the percent of stations reporting discharges in each flow range for both the conterminous United States and southern Canada, and also the percent of area in each flow range for the conterminous United States and southern Canada. The **combination bar/line graph** shows the percent departure of the total mean from the total median flow (1951-80) and the cumulative departure from median (in cfs) for all reporting stations (excluding eight large river stations indicated by # in the *Flow of large rivers* table) in the conterminous United States and southern Canada.

The comparative data are obtained by ranking the 30 flows for each month of the reference period in order of decreasing magnitude—the highest flow is given a ranking of 1 and the lowest flow is given a ranking of 30. Quartiles (25-percent points) are computed by averaging the 7th and 8th highest flows (upper quartile), 15th and 16th highest flows (middle quartile and median), and the 23rd and 24th highest flows (lower quartile). The upper and lower quartiles set off the highest and lowest 25 percent of flows, respectively, for the reference period. The median (middle quartile) is the middle value by definition. For the reference period, 50 percent of the flows are greater than the median, 50 percent are less than the median, 50 percent are between the upper and lower quartiles (in the normal range), 25 percent are greater than the upper quartile (above normal), and 25 percent are less than the lower quartile (below normal). Flow for the current month is then classified as: in the **above-normal range** if it is greater than the upper quartile, in the **normal range** if it is between the upper and lower quartiles, and in the **below-normal range** if it is less than the lower quartile. Change in flow from the previous month to the current month is classified as **seasonal** if the change is in the same direction as the change in the median. If the change is in the opposite direction of the change in the median, the change is classified as **contraseasonal** (opposite to the seasonal change). For example: at a particular index station, the January median is greater than the December median; if flow for the current January increased from December (the previous month), the increase is seasonal; if flow for the current January decreased from December, the decrease is contraseasonal.

Flood frequency analyses define the relation of flood peak magnitude to probability of occurrence or recurrence interval. **Probability of occurrence** is the chance that a given flood magnitude will be exceeded in any one year. **Recurrence interval** is the reciprocal of probability of occurrence and is the average number of years between occurrences. For example, a flood having a probability of occurrence of 0.01 (1 percent) has a recurrence interval of 100 years. **Recurrence intervals imply no regularity of occurrence**; a 100-year flood might be exceeded in consecutive years or it might not be exceeded in a 100-year period.

Statements about **ground-water levels** refer to conditions near the end of the month. The water level in each observation well is compared with average level for the end of the month determined from the entire period of record for that well. **Changes in ground-water levels**, unless described otherwise, are from the end of the previous month to the end of the current month.

Dissolved solids and temperature data are given for five stream-sampling sites that are part of the National Stream Quality Accounting Network (NASQAN). **Dissolved solids** are minerals dissolved in water and usually consist predominately of silica and ions of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, and nitrate. **Dissolved-solids discharge** represents the total daily amount of dissolved minerals carried by the stream. **Dissolved-solids concentrations** are generally higher during periods of low streamflow, but the highest dissolved-solids discharges occur during periods of high streamflow because the total quantities of water, and therefore total load of dissolved minerals, are so much greater than at times of low flow.

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